SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF ORANGE

ORANGE COUNTY WATER DISTRICT, Plaintiff, vs. NORTHROP CORPORATION, et al., Defendants.	No. 04CC00715
AND OTHER RELATED ACTIONS.	

DEPOSITION OF GLENN D. TOFANI

Costa Mesa, California

Wednesday, March 14, 2012

Volume 1

Reported by:
MARIANNA DONNER
CSR No. 7504
JOB No. 304145

SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF ORANGE

ORANGE COUNTY WATER DISTRICT, Plaintiff, vs. NORTHROP CORPORATION, NORTHROP GRUMMAN CORPORATION, AMERICAN ELECTRONICS, INC., GULTON INDUSTRIES, INC., MARK IV INDUSTRIES, INC., EDO CORPORATION, AEROJET-GENERAL CORPORATION, MOORE BUSINESS FORMS, INC., AC PRODUCTS, INC., FULLERTON MANUFACTURING COMPANY, FULLERTON BUSINESS PARK LLC, and Does 1 through 400, inclusive, Defendants. AND OTHER RELATED ACTIONS.	No. 04CC00715

Videotaped Deposition of

GLENN D. TOFANI, Volume 1, pages 1 through 227, taken on behalf of Plaintiff at 650 Towne Center Drive, Costa Mesa, California, beginning at 9:37 a.m. and ending at 5:06 p.m. on Wednesday,

March 14, 2012, before MARIANNA DONNER,
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Registered Professional Reporter
No. 38410.

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Costa Mesa, California

Wednesday, March 14, 2012

9:37 a.m. - 5:06 p.m.

THE VIDEOGRAPHER: Good morning. Here begins media number 1 of the deposition of Glenn Tofani in the matter of Orange County Water District versus Northrop Corporation, et al. This case is in the Superior Court of the State of California, County of Orange. The case number is 04CC00715.

Today's date is March 14th, 2012. The time on the video monitor is 9:37 a.m.

This deposition is taking place at 650 Towne Center Drive in Costa Mesa, California, and is being taken on behalf of the plaintiffs.

The videographer is Lauren Stambaugh, appearing on behalf of Biehl, et al., located in Orange, California. The court reporter preparing the official transcript of today's deposition is Marianna Donner of Biehl, et al.

Would counsel please identify yourselves and state whom you represent.

MR. MILLER: Good morning. I'm Duane Miller. I represent The Orange County Water District.

MR. SLOME: Good morning. I'm Ernest Slome. I

represent Northrop Grumman.

MS. THOMPSON: Cynthia Thompson with Northrop Grumman.

MS. BERLE: Joelle Berle with The Arnold Engineering Company.

MS. MEADOWS: Megan Meadows for Moore Wallace North America.

MR. KAPLAN: Philip Kaplan for Metropolitan Water District.

MR. MILLER: Counsel on the phone?

MR. SOBELMAN: Good morning. This is Donald Sobelman for The Boeing Company.

MR. ADAMS: Joseph Adams for Vista Paint Corporation.

THE VIDEOGRAPHER: Would the court reporter please swear in the witness.

(Witness sworn.)

THE WITNESS: I do.

/

/

/

GLENN D. TOFANI,

having been first duly sworn,

was examined and testified as follows:

EXAMINATION

BY MR. MILLER:

Q Please state your name and business address.

A First name is Glenn, G-l-e-n-n. Last name is Tofani, T-o-f-a-n-i. The business address is 77 Bunsen, Irvine, California.

Q Mr. Tofani, who retained you in this case?

A I was retained on behalf of Northrop by the Lewis Brisbois office.

Q Are you testifying on behalf of any other defendant?

A Not that I'm aware of.

Q When were you retained?

A I don't recall the exact date. I was retained as a consultant several years ago.

Q Can you estimate the year for me, please?

A I would say it was approximately 2006.

Q Is it your understanding you were retained before or after this lawsuit was filed?

A I don't know what date the lawsuit was filed.

Q You produced reports and graphics this morning. Can you describe generally what they are, please?

A Yes. They're -- for each of what I will refer to as three primary Northrop sites, there's an assessment report, which provides a summary of the historic operations for that site. It talks about regulatory involvement, any documented or suspected releases, and it talks about any investigation, remediation activities that took place at that site, and also includes a summary of the current status, regulatory status, of the site.

Each one of those summary reports as I believe Attachment A contains a chronological list of all of the technical documents that I have reviewed that pertain to that site.

So that's the first document, or set of documents for each site, the report.

In I believe each case there's an 8-and-a-half-by-11 bound volume that has text and tables and some figures in it. For the most part where there are separate 11-by-17-size figures, those have been printed out in a separate volume that's attached to the report so it doesn't get to be too bulky.

Then there's a second document for each site, which is a -- or referred to as a site assessment summary which outlines what my assignment was for each site, what scope of work was undertaken to complete that assignment, and then it lists a series of what I would characterize as the primary observations or opinions that I have regarding my assignment.

Q Collectively these documents are about 10 inches?

A I would estimate --

MR. SLOME: Do you mean per site or for all three?

MR. MILLER: All three.

THE WITNESS: Approximately four inches.

BY MR. MILLER:

Q That's the fattest four inches I've ever seen in my life.

MR. SLOME: Is this all three -- may not be all three.

BY MR. MILLER:

Q Could you just bring them over in front of you so they appear on the camera, please?

A Certainly. I can hold this up for scale, if you like.

Q When were those documents completed?
A I would say generally within the last one to two hours.
Q When did you start work on them?
A Well, there's components of these documents that I started working on years ago, and notably the document summary that's included with each of the site assessment reports as Attachment A. But as far as the opinion summaries and the narratives of the report, those were all initiated and completed within the last few days.
MR. MILLER: I am concerned that the manner of production, particularly the fact that I only have a physical copy here and no electronic copy is available to send to my experts, is going to result in another session of this deposition that could have been avoided.
MR. SLOME: Well, we don't concede that you are entitled to that, but let's take that up when -- let's take that issue up when it arises.
MR. MILLER: Whether you concede it or not, I'm going to expect an assurance that you will produce this witness at another session in view of the late production. If I don't get that assurance, we'll take it up with the judge.

We're having a continuing problem and it's getting worse and worse.

I have to discuss something with Mr. Elie concerning Mr. Larson's production. He's not here this morning. I'm going to give him a call. I was hoping to talk to him. Some of the deposition material is such that if it's not available significantly in advance of the deposition, it almost makes the deposition pointless when the witness' primary function appears to be testifying about models. So I'm going to have to talk to him about that.

I came here almost an hour early. I had nothing to read. All of this was produced within five minutes of the start of this deposition, more or less. I realize from what the witness said there's an explanation, but the bottom line is that this pattern of production creates unnecessary problems that could have been avoided if I had a chance to read the materials and, more importantly, if my experts had a chance to read the materials before we started, I could be much more efficient.

I don't just ask questions for the sake of asking them. It's usually because I've prepared, I have a point to make and I'm moving on. And when I

get this kind of production at this time, it virtually forces me, particularly if you claim that this is a comprehensive deposition in two days, to ask a wide variety of questions that would be needless if I could just read the material.

So I'm a little concerned about the pattern. I'm making a point for a reason. I've been putting up with it, but it's getting worse and worse. And putting up with it doesn't seem to be helping.

MR. SMITH: Duane, this is Bob Smith.

This is exactly -- I wouldn't call it the pattern. This is exactly the method that was used by The District in producing Fogg's opinions which were handed to us the day of his deposition.

But rest assured, just as you produced Fogg on multiple occasions, you can have Mr. Tofani as many times as you reasonably need him now or in the future.

I have reviewed his work product. I think you will find that his actual opinions are very easy to follow. You are very quick. You can probably do a great exam today and tomorrow. But if you need more time, you can have it.

MR. MILLER: I would point out that for Dr. Waddell who covered all of the sites, we had

comprehensive written reports produced significantly in advance of the deposition. One thing that caused him to produce supplemental production is late production of testing results by defendants.

So I recognize Dr. Fogg had a slightly different pattern and I think you are familiar with the explanation for it, but we did make an effort to produce reports significantly in advance and did so for most of our experts.

Anyway, enough about speeches. Let's get going.

(Plaintiff's Exhibit 1 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Let me show you Exhibit 1. Is that your statement of professional qualifications and is it complete and current?

A This looks like an older copy of my resume. I would say that's not current.

MR. MILLER: Can counsel make arrangements to give me the current version, or do you have one?

THE WITNESS: Yes, I believe I brought one with me.

MR. MILLER: We'll mark that as Exhibit 2.

(Plaintiff's Exhibit 2 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Mr. Tofani, is this version, Exhibit 2, current and complete, including any publications that are in press or otherwise not yet published?

A I would say yes. There is a paper that I've been asked to present at a conference in Toronto next year, but I really haven't started preparing that. It's not referenced in that resume.

MR. MILLER: Let me show you Exhibit 3. It's the notice of this deposition.

(Plaintiff's Exhibit 3 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Did you receive and review a copy?

A I believe I have seen this, yes.

Q You understood that you were required to produce your entire file concerning this lawsuit, including E-mails, correct?

A Yes.

Q Did you do that?

A I produced everything that I was able to

produce while I was working on the file over the last several days.

Q Does that mean you produced everything or is there some exception?

A I can't think of an exception off the top of my head, but I would be surprised if we don't come across something over the course of the deposition.

Q That you inadvertently failed to produce?

A Yes.

Q Is that because of the volume of material basically?

A Yes.

Q Any other reason?

A No.

Q Is some member of your staff going through the production to make sure it's complete?

A That would have to be me in that --

Q That wouldn't be a member of your staff, though.

A Well, I consider myself to be a member of my staff.

Q Okay. How can we be sure that we have a complete copy of all of your documents if we don't have that assurance at the moment? It appears that you were relatively busy lately. That is the type of

thing that causes things to be overlooked.

What would you suggest?

A I will review at my first opportunity what's been produced and see if there's anything that should have been that wasn't.

What I have done to date while I was preparing the summary reports and the opinion summaries, to the extent there was any document or any piece of information that I relied on, I would retrieve that and make sure it was in the file that was either produced via our FTP site or that I brought a copy of that document with me today.

Q So there may be some documents that you have copies with you today that haven't been produced?

A Yes, there are.

Q What type of category of documents would that be, if you could generically describe it for me?

A One that comes to mind that you just mentioned is yesterday I printed out all the E-mail correspondence I have to or from the Water Board, and I brought a copy of that with me today in one of the boxes up against the wall.

Q And so far that's not been produced?

A Correct.

Q What else?

A That I brought with me today that has not been produced previously?

Q Yes. Or that you are otherwise aware of as a category of documents that has likely not to have been produced yet for whatever reason. This is -- I need a sense of what it is at this point in time. I'm not -- I don't want to spend a lot of time about why it wasn't produced. I just need to know what may not have been produced.

A That would include the site assessment reports and the opinion summaries that we discussed briefly already.

Q That you made available this morning?

A Yes. That would include this memorandum, which was printed and produced last night, regarding a groundwater model.

Q Okay. I believe in the materials I was handed this morning I was given site-specific and related materials as opposed to this summary of groundwater flow model. I don't think it's in the stack that I was given.

A It is not. This is a stack of separate documents.

Q In addition to the site reports, correct?

A Yes.

Q Okay. I don't have a copy set of these at the moment.

The first one is entitled "Summary of Groundwater Flow Model Anaheim Forebay, March 13, 2012."

So was this prepared yesterday but not yet produced?

A Correct.

Q This reflects your modeling efforts and related opinions?

A It describes how the model was assembled and calibrated and it presents results that have been presented previously.

Q To?

A The Water Board. And they also were uploaded a week ago to our FTP site.

Q What do those results look like as documents? Are we talking about output from a model, or something else?

A No. Summary figures showing groundwater circulation patterns and cross-section and in-plan view.

Q So does the groundwater flow model relate to the recirculation well only or some other subject?

A To the extent that it's described here and

in the status reports that have been submitted to the Water Board, to the circulation well only.

Q Okay. But there's additional modeling, correct?

A There's a larger regional model that was adapted from The OCWD's groundwater model that was calibrated on a regional scale and then a sub model, if you will, was created from that to perform the circulation well modeling, and that process is described in the memo that I just handed you.

Q What additional documents are in that stack that I do not yet have?

A This is a preliminary cost assessment of The OCWD remediation system based on costs that were presented in 2008.

Q Has this been produced yet?

A I don't believe so.

MR. MILLER: So I need this document to go to a different expert.

MR. SLOME: Well, the plan is to upload them to the FTP site and then you can make them available.

MR. MILLER: The smaller site summary reports, they are only five to ten pages, the very brief ones --

MR. SLOME: Yes.

MR. MILLER: -- for Y-12 and Kester, I was hoping you could just PDF those and we could send them to my expert. It wouldn't take much work to do that here at the law firm.

Could we do that?

MR. SLOME: I think so.

MR. MILLER: All right. And then this preliminary assessment of costs looks like it has a numbering series that goes through 100-some-odd pages, not counting the narrative report, and numerous tables, including prices on chain-link fence.

Q This is a review of Tetra Tech's work; is that correct?

A Yes.

MR. SLOME: Do you want to identify what this is?

BY MR. MILLER:

Q Please describe the document for the record.

A The title of this binder, and it's approximately an inch thick, is "Preliminary Assessment of Costs Associated with OCWD Groundwater Remediation System" as presented by Tetra Tech November 2008.

Q So you have a whole separate set of opinions

that relate to the cost of the project; is that correct?

A The project as it was presented at that time at least, yes.

Q What is the next document?

A There's a stack of plume maps and piezometric contour maps that were prepared by or on behalf of Orange County Water District.

Q Did you leave some behind there?

A This is a separate item I was going to get to next.

MR. MILLER: All right. Are we going to get a production of this with Bates numbers?

MR. SLOME: You are going to get a production of it. I don't know that you will get it with Bates numbers.

BY MR. MILLER:

Q Okay. What else do you have that you are producing this morning?

A This is multiple copies of a single figure that illustrates my understanding of the mounding -- groundwater mounding theory that's been postulated by Dr. Waddell to have occurred at the EMD site.

Q Okay. And the next?

A These -- this is a graphic summary of the

1987, 1988 soil vapor survey results for the Y-12 facility. This was previously produced and uploaded to our FTP site approximately a week ago.

Q Next?

A This is a compilation of predominantly the Orange County Water District VOC monitoring results for the area wells. For each of the wells we've plotted the VOC concentrations as a function of time, along with the groundwater elevation data, and superimposed monthly rainfall data on it as well.

It also includes data from the Northrop monitoring wells and a few other selected monitoring wells from PRP sites.

Many of these graphs had been produced previously and uploaded to the FTP site and are included also in the reports that I gave you today, but this is a full compilation.

Q Have we now gone over all of the materials not previously produced, including categories that may not be in front of us but you haven't produced yet? You gave the example of E-mails to and from the Regional Board.

What else is there?

A There are two sets of short notes here that I obtained from Orion summarizing the chronologies

and the remedial efforts at the Kester site. Those may have been produced previously by Orion, I don't know.

Got a printout of some chemical notification MSDS-type sheets from Kester Solder, the current operations, that list some of the compounds or chemicals that are used in their products.

Q Did you get -- strike that.

As part of your work have you ever assembled or received copies or viewed copies of MSDSs for the Northrop Y-12 site, anything they had in their files or related materials?

A I've seen records that describe or relate to the types and quantities of chemicals that were used and stored at the facility. I don't know if I've seen anything that I would characterize as an MSDS.

Q Same question for EMD.

A Same response.

Q Does Northrop have historical records concerning the chemicals used at any of these sites on which you have opinions?

A Yes.

And to the extent that they have them, I've listed them in the chronological review of documents that was posted on our FTP site last week and is

contained in the site summary reports.

Q When did Northrop first occupy the subject property at Y-12?

A That's described in the Y-12 summary report that I provided, as well as the document summary, which is Attachment A at the rear.

For the Y-12 site, that was 1962.

Q Prior to that it was farming?

A Yes. That's my understanding.

Q And when did Northrop last occupy the premises called Y-12?

A As an owner?

Q At all.

A Northrop has ongoing remediation operations at that site today, so their representatives or personnel are periodically present on that site.

Q When did they last have manufacturing operations, to your understanding, at the Y-12 site?

A The facility was -- or the manufacturing operations look like they were terminated in 1994.

Q Does Northrop have comprehensive records concerning chemicals used at the site between 1962 and 1994?

MR. SLOME: Objection; vague and ambiguous as to "comprehensive."

BY MR. MILLER:

Q Complete.

A I'm not sure what you mean by "complete."

There are a lot of records that document the types of operations that took place at that facility and the specific chemicals that were used. I don't know if they go all of the way back to the early '60s, though.

Q That's one of reasons for my question.

Did you look to see if the records covered the full timeframe back to 1962?

A Yes.

Q Do the records for the early period in the early '60s appear to be less complete?

A There's no question there are fewer records for the '60s and the '70s and more records for the '80s and '90s.

Some of the records for the '80s and '90s discuss some of the processes and the chemicals that were used during the earlier years, but there are much fewer records that I have seen for the '60s and the '70s.

Q So those records may well be incomplete; is that correct?

MR. SLOME: Objection; calls for speculation.

THE WITNESS: I'm not sure what you mean by "incomplete."

BY MR. MILLER:

Q Chemicals may have been used that are not discussed in the documents available for the time period of the '60s and/or '70s.

A I suppose that's possible, yes.

Q With respect to the EMD site, when did Northrop first operate at that location?

A In approximately 1951.

Q And when did they last operate at that location?

A That facility was dismantled/demolished in 1990.

Q Are there comprehensive records on chemical usage for the EMD facility that cover the period from 1951 through 1990?

A I would say it's similar to the Y-12 site where there are fewer records that I've seen for the early years, the '50s and the '60s, and progressively more as you get into the '80s and '90s.

Q And let's complete it by discussing the Kester Solder facility.

MR. SLOME: Is the question when were operations started and finished in Kester?

MR. MILLER: Yes. And then we're going to go into the records.

Q So when were operations started at Kester Solder?

A And does your question relate to Northrop's operations or to the original Kester operation?

Q When did Kester first operate at the site as opposed to Northrop?

A Approximately 1968.

Q When did Northrop take over the facility and its operations?

A In April of 2001 Northrop purchased Litten Industries, and Litten Industries had previously purchased Kester in 1967.

Q And when did Northrop stop its operations at the Kester Solder site?

A Approximately one year later after it purchased Litten.

Q Are there comprehensive chemical use records for the period prior to Northrop's purchase of the property, referring to Kester Solder?

A I would say it's similar to the other two facilities where the records are sparser, if you will, during the '60s and '70s and then become more plentiful during the '80s and '90s.

Q Did Northrop own the Y-12 site?
A Yes, though not initially.
Q Did Northrop own the EMD site?
A Yes, although it was purchased in phases.
Q And did Northrop own the Kester Solder site?
A It may require a legal opinion to answer that question. I believe the title to the property was and still is held by Kester Solder. My assumption would be that once Northrop purchased Litten, who owned Kester, that Northrop would effectively own the property.

But again I believe that's more of a legal assessment than a technical one.

Q Did Northrop try to sell the Kester Solder property?
A It's my understanding that that was or is their intention, to sell the property.
Q Do they own it today?
A I believe title is held by Kester, and I believe Northrop still owns that component.
Q Does Northrop own the EMD site today?
A No, I don't believe so.
Q Did Northrop sell it?
A Yes. That's my understanding.
Q Did --

Does Northrop own the Y-12 site today?
A I don't believe so, no.
Q Did Northrop sell it?
A Yes.
(Plaintiff's Exhibit 4 was marked for identification and is attached hereto.)
BY MR. MILLER:
Q Let me show you Exhibit 4.
MR. SLOME: Let's get ourselves a little organized and put this stuff away.
BY MR. MILLER:
Q Oh, did we complete all of the documents that have not been previously produced?
You have given me a pile of material safety data sheets from Kester Solder.
Is there anything else?
A Yes. I was getting ready to mention it. I don't think we've finished going through that.
There is a stack of notes that I took related to my review of Dr. Waddell's deposition transcript that I've just handed you.
You are only interested in documents that haven't been produced previously?
Q Correct.

A This is a letter that I -- or actually two letters that I printed out while I was doing my Kester writeup that relates to the classification of solder dross and whether it falls under RCRA guidelines as a waste or not.

Q Dross is some type of byproduct from soldering activities on printed circuit boards?

A Yes.

Q Okay. Please continue with your list of materials not previously produced.

A The next figure I believe has been produced in a prior report that was submitted to the Water Board and posted on our FTP site, but I'm not certain so I printed out a copy of it and brought it with me today. That shows the performance criteria, if you will, hydraulic performance criteria for the circulation well at the Y-12 site.

Q Okay. It's labeled "Hydraulic Performance of Circulation Well Figure 6 March 2010," correct?

A Yes.

Q Anything else?

A The next is just a figure I printed out while I was reviewing the Y-12 documents. It shows the configuration or location of a floor beam through a 747 aircraft.

(Whereupon Mr. Gibson entered the proceedings.)

THE WITNESS: This stack, or this table, is a list of dissolved oxygen levels and temperature levels from The OCWD database for monitoring wells in the vicinity of EMD.

BY MR. MILLER:

Q Is it fair to say that dissolved oxygen levels are rather high?

A High enough so that generally it wouldn't characterize it as an anaerobic environment.

Q At what level of dissolved oxygen in milligrams per liter would you say the system is no longer aerobic?

A By the time you get down to 1 to 2 milligrams per liter that's often described as a low oxygen, or at least potentially anaerobic environment.

Q I see some values here that are above 8 but only by a fraction. Isn't that basically the limit of dissolved oxygen in water? You start suspecting the lab made a mistake if you see a 9 or higher?

A You are getting near the natural saturation level of oxygen if you get up around 8, 9 or 10. If you got a site where you are adding in oxygen, such

as hydrogen peroxide, for example, you can get into the tens of milligrams per liter pretty easily.

Q But in natural conditions you would expect it to be 8 or less?

A Well, not necessarily. I've seen a lot of sites where it approaches saturated levels, 8 or 9 milligrams per liter.

Q I see one value in here of 11.8 at AM-42. Is that likely to be a lab error?

A That's getting to be pretty high, and that may actually exceed the saturation limit. Might suggest that there was some disturbance or aeration of that sample when they collected it.

Q All right. What's the next document you may not have previously produced?

A This is an OCWD summary table, or a summary table that OCWD -- pump testing results from their extraction wells.

Q Is this just a compilation of analytical results from testing the extraction wells or something different than that?

A The former.

Q Next?

A A couple OCWD brochures.

Q How do these relate to your opinions?

A I don't know frankly that they do, but they provide an overview of some of the recharge facilities and operations. And depending upon what sort of questions you ask me today, they -- I thought they might be a useful reference.

Q So the first brochure relates to the groundwater replenishment system. It's labeled "Press Kit" and basically it has pictures and describes the system?

A Yes.

Q And then the next document is the "National Water Research Institute Report of the Scientific Advisory Panel Concerning Santa Ana River Water Quality and Health Study, August 2004."

And that's the material you just handed me, correct?

A Correct.

Q What else do you have that you may not have previously produced?

A There's an oversized site plan that I believe has been produced previously, since it has a Bates number on it, but not by my office. This was a site plan for the EMD property that was prepared by Dames & Moore in conjunction with their assessment work at that property.

Q Basically does it show locations where Dames & Moore in their report describe testing that had been done or should be done?

A Yes. And it also shows facility improvements and labels some of the operations which is helpful.

Q Okay. What else?

A I will need to look through the boxes I brought with me today to see what else is contained in there that may not have been produced previously.

Q You haven't had a chance to do that yet?

A I have looked through the boxes, yes, since they -- prior to them being brought here.

Q All right. We will do that later.

But to the best of your ability at this time, have you generally identified the categories of documents not yet produced? Are there any other categories that you can describe for me?

A All of the technical documents that I have reviewed, for the most part I believe those have been produced by other parties. I've listed those in the Attachment A chronology document summaries in each report, but I haven't tried to copy -- recopy and reproduce all of those technical references.

Q Okay. What else?

A There is a stack of the Water Board E-mail correspondence that I referenced earlier that I know is in one of the boxes.

Q What else?

A I can't think of anything else off the top of my head, but I suspect there are some other items.

Q So without going through the boxes, you've given me the best list you can of what you have not yet produced?

A Yes.

Q All right. Now I want to show you Exhibit 4 to your deposition. Is this a comprehensive and complete list of all modeling that you have performed, or associates with your firm have performed related to this project?

A I would add to this list the memorandum that I handed you a few minutes ago that was prepared by Mr. Colby.

Q How do you spell that?

A Last name?

Q Yes.

A C-o-l-b-y.

Q I didn't hear it the same way, that's why I needed it spelled. Now it seems obvious.

Anything else in the way of modeling other

than what's listed in Exhibit 4 and described in the document you produced this morning?

A That relates to my expert assignment on this project, I don't believe so.

Q Or your work concerning this project. You said "expert assignment," and I understand that you did some work as a member of the team that deals with cleanup and investigation of the site.

So I need to know if you have something that you did in the way of modeling that wasn't expert work.

A I included that work that you just described as part of my expert assignment.

Q So there's no other modeling work you've done that is related to this case that you haven't described in Exhibit 4 or in the document you produced this morning you've already identified?

A As part of my expert assignment.

Q I don't understand why you keep putting that qualifier in.

A The reason that I have is there is consulting work or consulting tasks that I've worked on for the Lewis Brisbois office as well that is separate and apart from my expert assignment at these sites.

Q In my view, if you've done any work for Lewis Brisbois related to this case, whether you call it consulting work, expert work or other work, I'm entitled to know about it. And counsel will instruct you if he disagrees, and we'll get the judge on the phone if he disagrees.

MR. SLOME: I disagree.

BY MR. MILLER:

Q So what type of modeling have you done as a consultant?

MR. SLOME: Work that you performed as a consultant is privileged. It's subject both to attorney/client and/or attorney work product privilege, and you should not discuss that.

MR. MILLER: Please mark that.

THE REPORTER: Okay.

BY MR. MILLER:

Q Besides modeling work, is there any other work that you've done as a consultant relating to this case?

A Yes.

Q What type of work?

MR. SLOME: Again work that you performed as a consultant must not be -- be subject to the same privilege. Other than that fact, you can answer.

MR. MILLER: Other than the fact that he can't answer, he can?

MR. SLOME: No. He should not disclose the work he's performed as a consultant.

MR. MILLER: Can he describe it so that the judge has some understanding of what the issue is? Normally in order to assert the privilege, some foundational facts are laid.

MR. SLOME: Well, I'm concerned that the foundational facts might themselves be a disclosure -- an improper disclosure. So I mean if there's a way we can get over that, sure.

MR. MILLER: Well, the bottom line is it's my experience that a retained expert in a case cannot decline to disclose work he did related to the case by simply putting the label "consulting work" on it and differentiating it from expert work. There's literally no case law to support that.

I find that this is an interesting and novel interpretation of privilege, but I need to lay a bit of a foundation so that we have some understanding of what the issue is.

MR. SLOME: As I'm sure Mr. Kaplan will tell you, we've recently litigated a similar issue. And in fact, there is case law strongly supporting the

entitlement of an expert to maintain confidences with regard to work that is performed as a consultant.

MR. MILLER: I'm familiar with Rule 26 in Federal settings, which is not available here.

MR. SLOME: This is California case law.

But putting all of that aside, is there a way you could describe, in a manner that doesn't disclose the privilege, the information that counsel is asking for?

THE WITNESS: I can describe the general types of tasks or assignments I was giving as a consultant. I don't know how that affects the privilege.

MR. MILLER: If you need a minute to talk to him, take it.

MR. SLOME: Yeah, I think so.

Let's go off the record.

THE VIDEOGRAPHER: We're going off the record. The time is 10:26.

(Off the record.)

(Whereupon Mr. Faulk entered the proceedings.)

THE VIDEOGRAPHER: We are now back on the record. The time is 10:44.

BY MR. MILLER:

Q Mr. Tofani, have you had a chance during the

break to check the boxes?

A I did, yes.

Q Are there other categories of documents that you have that may not have been produced based on the limited review you did during the break?

A Well, I'm not sure. We talked about the E-mails before, so I would say it's not a new category. But I did pull the E-mails out of the box.

Q Okay. Is this the only copy?

A Yes. Although I can recreate that, if necessary.

MR. MILLER: If it's okay, I will just give it to counsel. Maybe you can make a copy, and is it possible to Bates it? I don't want to take his only copy.

MR. SLOME: It's certainly possible to make a copy, that's not a problem. Bates'g it is -- it concerns me because I don't know that we're going to Bates all of the documents, and if we're not going to Bates all of the documents I don't know that it makes sense to Bates one particular item of documents.

I will certainly have these copied and, in fact, if you want me to, I can go outside now, ask someone to have them copied in the next while and we can have them done. But I just don't know that

Bates'g gets anybody anywhere.

MR. MILLER: Well, I respectfully disagree. The fact that you can't do perfect work doesn't mean that you should do no work.

That's just a philosophical point of view that I have. I've tried to explain that to employees before.

MR. SLOME: Why don't I go -- give me two minutes off the record. You can stay on the record, just give me two minutes to get this done.

MR. MILLER: We'll go off the record. Go ahead.

THE VIDEOGRAPHER: We're going off the record. The time is 10:46.

(Off the record.)

THE VIDEOGRAPHER: We are now back on the record. The time is 10:47.

MR. MILLER: So pursuant to discussions with counsel, we're going to have that group of documents copied and a Bates number, hopefully beginning with "T," will be applied to the E-mail group that the witness handed to me.

Q Any other documents that you identified during the break or otherwise haven't mentioned?

A I believe these three sets of bound documents are documents that have been produced to

you previously, but these have been compiled in a different format than what I have before me.

Each one is a summary of the various figures that were available for each of the Northrop sites that indicate groundwater piezometric levels or flow directions taken from the status reports that were produced to the Water Board for these sites.

Q Okay. Can we add that to the stack, please.

Anything else?

A There are three rolls of oversize prints at the end of the table. One roll is -- contains site plans with OCWD groundwater elevation data on it produced from The OCWD data file.

Q Site plans for what?

A The North Basin area.

Q Okay.

A The second roll contains data regarding the VOC levels that were measured historically in The OCWD monitoring wells. It will list the maximum historic concentration of a particular VOC for a particular well, then it will list the most recent VOC concentration measured in that well. And on those diagrams we have superimposed the plumes that were drawn by Dr. Waddell for the various sites for reference purposes.

The third set of rolled documents contains the same dataset of groundwater VOC levels where we have drawn from localized plumes generally in the vicinity of the Northrop sites as part of my assessment activities or site evaluation activities.

Q Do those localized plumes provide or support opinions concerning upgradient sources?

A In some cases, yes.

Q Anything else?

A No, I don't believe so.

Q I will look at the maps during a break to see what I need to do with those. So if you could leave them there, at least for now, I would appreciate it.

A Certainly.

Q Do the narrative reports produced today identify any upgradient sources of chemicals of concern relating to this case?

MR. SLOME: For each of the three reports?

BY MR. MILLER:

Q For any of the three reports.

A All three reports refer generally to upgradient sources of VOCs. I would say the EMD report is a little bit more specific in the assessment. It contains a more detailed description

of the particular VOCs that have migrated onto or past the EMD site with a more detailed description of the apparent source area for those VOCs.

Q I need to cover some subjects you may not be covering so at least I know that I don't need to spend time on it or if I get a different response I will spend time on it.

Have you developed your own design of a centralized treatment facility and estimated its cost relating to remediation of chemicals of concern in the project area? And by "the project area," I assume you know what I'm referring to. I'm referring to the Orange County Water District's North Basin Groundwater Protection Project.

A I do.

And not that it would necessarily be applicable in answering your question, but for the sake of simplicity I will attempt to answer each of these questions relative to my expert assignment in this case.

And the answer to your question would be no.

Q Have you developed the cost of a decentralized treatment system to address contamination in the project area?

A Only to the extent that I've summarized

costs associated with the circulation well that was installed on the Y-12 site.

Q Have you done an estimate of what it would cost to install an adequate number of recirculation wells of whatever type to fully treat the plume?

MR. SLOME: Objection; vague and ambiguous.

THE WITNESS: No.

BY MR. MILLER:

Q Do you have any way of estimating the number of recirculation wells that would be required to deal with the full extent of the plume?

A Yes.

Q And what is that estimate?

A You asked me if I had a way to estimate, make that estimate, not if I had done that estimate.

Q Have you done the estimate?

A No.

Q Do you have some reason to believe that it would take the same number of recirculation wells as the number of planned extraction wells?

A By "planned extraction wells," you are referring to The OCWD system?

Q Yes.

A I think the planned extraction wells could be configured to operate as recirculation wells with

a very nominal loss of efficiency.

MR. SMITH: This is beyond the scope of his designated testimony.

MR. MILLER: That's helpful, but I have to ask questions to make sure that that's true.

Q Do you know if additional recirculation wells would be required to maintain the same level of hydraulic capture as the extraction well system proposed by The District?

MR. SMITH: Same objection.

THE WITNESS: I believe very close to the same level of capture could be attained operating the wells as recirculation wells but not identical.

BY MR. MILLER:

Q In order to answer the question I just posed, wouldn't you need to do a capture zone analysis?

A Yes.

Q Have you done that?

A I've reviewed the capture zone analysis that was done by The OCWD consultants.

Q Have you done the review that is necessary to testify concerning Mr. Greenwald's work on the capture zone analysis done for The District?

MR. SLOME: Objection; assumes facts.

This is outside the witness' scope and so the question assumes facts.

THE WITNESS: I believe that is outside my scope, so I have not as part of my expert assignment.

BY MR. MILLER:

Q So none of your opinions relate to Mr. Greenwald's work; is that correct?

A I believe you would have to be more specific as to the scope of his work.

Q Did you review his deposition?

A I have not read all of his deposition transcripts.

Q Have you read some of it?

A I believe I have seen some of his deposition transcripts, yes.

Q To your knowledge, from reviewing the transcript and/or his written materials produced for his deposition, is there any aspect of his opinions that you are covering?

A I can't identify for you what his opinions are, so I may have opinions that would be similar to his or that differ from his.

Q Are you familiar with the concept of hydraulic capture of a groundwater plume?

A Yes.

Q Why is something like that done?
MR. SLOME: Objection; vague, ambiguous.
MR. MILLER: I'll rephrase.
Q Why do people in your field sometimes design remedial systems to hydraulically capture plumes?
A Generally to minimize the rate or mass at which VOCs would migrate in a downgradient direction past the recovery wells.
Q Other than hydraulic capture, is there any other way to truly stop a plume from migrating downgradient?
A Yes.
Q What?
A The contaminants of concern could be eliminated as they migrate downgradient.
Q Other than your recirculation well we're going to spend some time on later, is there any other technology that could be used to do that effectively; that is, to effectively hydraulically contain a plume?
A You're not talking about destroying the contamination now. You are talking about hydraulic containment?
Q Correct.
A I hesitated because you said other than the

recirculation well and a recirculation well is not intended to hydraulically contain a plume.

If you are limiting it to hydraulic containment, you asked if there's anything other than an extraction well or an extraction well system that can do that?

Q Other than a pump and treat system --

And by that of course, I am referring to extraction wells.

Other than a pump and treat system, is there any other technology you are familiar with that effectively hydraulically contains groundwater plumes?

A You could have an extraction gallery or an extraction trench. It wouldn't necessarily need to be a well, but the principal would be the same.

Q Anything else?

A Not that I can think of, no.

Q And your recirculation system is designed to destroy the contaminant as opposed to hydraulically contain it; is that correct?

A Yes.

Q Do you have any opinions concerning the biodegradation of any chemicals of concern in this case?

MR. SLOME: Objection; vague, ambiguous.
THE WITNESS: And again, this goes outside of the area that I've been asked to provide expert testimony.
MR. SLOME: Then let me add beyond the scope.
THE WITNESS: With that caveat, yes, I believe biodegradation is locally occurring within the project area.
BY MR. MILLER:
Q Have you done any of the analysis suggested by the federal government in their guidelines concerning monitored natural attenuation to form an opinion that any portion of the VOC plume The District plans to remediate could be adequately handled only by monitored natural attenuation?
MR. SLOME: Objection; vague, ambiguous.
THE WITNESS: Yes. I've evaluated that as part of my review of the project documents.
BY MR. MILLER:
Q And were you given that subject as an assignment concerning this case?
A No.
Q Your firm is preparing reports and submitting them to the Regional Board for review concerning each of the Northrop sites; is that

correct?

A No.

MR. SLOME: The objection, assumes facts, misstates the record.

BY MR. MILLER:

Q What sites?

A The Y-12 site only.

Q You're doing no work on the EMD site or Kester Solder site as I described it; that is, submitting reports to the Regional Board or work plans to the Regional Board for their review?

A Correct.

Q Is any consultant currently submitting work plans or doing investigative work submitted to the Regional Board for review with respect to the EMD site?

A Not that I'm aware of.

Q Same question for Kester Solder.

A Yes.

Q Who is that?

A Orion Environmental.

Q And is any consultant doing work relating to the Y-19 site, to your knowledge, that's being submitted to the Regional Board?

A Not that I'm aware of.

Q As part of your work as a consultant for the Y-12 site submitting documents including work plans to the Regional Board, have you ever proposed that monitored natural attenuation be used as a strategy to deal with any solvents at the site or any other contaminants of concern at the site?

A No.

Q Is it your understanding, then, in order to use monitored natural attenuation as a remedial strategy under Regional Board or DTSC supervision, you have to prepare a work plan explaining to them how you plan to use monitored natural attenuation and explain the basis for believing that it will work?

MR. SLOME: Objection; compound.

THE WITNESS: I would say what you've described is a typical scenario. I'm not sure it's the only way that it can be done.

BY MR. MILLER:

Q The only way you can proceed with monitored natural attenuation as a remediation strategy at a site is with state regulatory approval, correct?

A Well, certainly there have been sites where attenuation has been allowed to occur naturally without state approval.

Q If you are using it as a remediation

strategy, that is, monitored natural attenuation, don't you have to get state approval?

A If you are using it as a state approved remedial approach, then I think it's safe to say you have to get state approval.

Q And why haven't you applied for state approval to use monitored natural attenuation to deal with the contaminants associated with the Northrop Y-12 site?

A The first and principle, if you will, step in the remedial process is the source elimination, and Y-12 is still in that stage of the process.

Q When you say "source elimination," are you talking about PCE contamination in the soil?

A No. Primarily "T" as in Tom, TCE contamination.

MR. SLOME: And we're still talking about Y-12, right?

MR. MILLER: I'm going to go through each of the contaminants separately at Y-12.

Q The TCE contamination you referred to is in the soil?

A Yes.

Q Groundwater?

A Perched zone, yes.

Q Regional aquifer?
A Shallow aquifer, yes.
Q Principal aquifer?
A Not that I've identified.
Q With respect to PCE contamination at the Y-12 site that still needs to be remediated, are you claiming that all of the needed remediation for PCE in the soil's been done?
A It does not appear to me as if the Y-12 site was ever a significant source of PCE as opposed to TCE.
Q Is the Y-12 site a significant source of TCE in soil and groundwater?
A As far as the perched zone and the upper portion of the shallow aquifer, it has been in the past.
Q And the soil?
A Yes.
Q Is the groundwater fully remediated with respect to TCE contamination coming from the Y-12 site?
A No.
Q Do you have any estimated date for completion of groundwater remediation for the Y-12 site?

A The estimate for completion of the source removal activities is approximately two years.

Q From now?

A Yes. And I believe that would coincide very closely with the completion of the groundwater remediation activities.

Q What are you doing now that is going to take two years to eliminate contamination in the soil at Y-12?

A There's ongoing operation of a soil vapor extraction system and a dual-phase extraction system at Y-12.

Q What is the approximate total amount of TCE that's been removed? And I'm talking about through any remedial technology, not just SVE, but I'm focusing right now on the soil.

A As of the end of 2011, I believe the total mass of all VOCs recovered by the remediation systems I've just described at the Y-12 site was approximately 18,917 pounds.

Q And that's remediation of the soil, correct?

A Soil and perched groundwater.

Q What technology did you use to deal with removal from perched groundwater?

A Dual-phase extraction, high-vacuum

dual-phase extraction.

Q When was that system started?

A In January of 2009.

Q Prior to January 2009, would those 18,900 plus pounds of VOCs present in the soil have been a potential source of contamination of groundwater?

A That mass total was not entirely present in the soil at that date, and that the soil vapor extraction portion of the remediation system started before January of 2009.

Q When did it start?

A In August of 2008.

Q Prior to August of 2008 were there at least, in round numbers, 19,000 pounds of VOCs present in the soil at the Y-12 site that could cause groundwater contamination?

A Not exactly in that a portion of that contamination I believe originated from releases at adjacent sites that was recovered as part of the Y-12 system.

Q What adjacent site or sites?

A Aero Scientific/Trilogy Plumbing is an adjacent site where there appears to have been releases in the past, and a portion of that contamination would have been and has been recovered

by the Y-12 system.

Q What else?

A That would be the primary additional site that I've identified to date next to Y-12.

Q Compared to the total of 19,000 pounds, aren't we talking about less than 3,000 pounds from the area where Aero Scientific was located?

A I haven't done that calculation, but just looking at the soil vapor testing results, I think it could be a higher percentage than that.

Q If you look at -- strike that.

Have you reviewed the estimate of mass removal at the SVE location near the portion of the property that borders on Aero Scientific?

A I'm sorry. Could you read that back?

Q If the reports concerning operation of the SVE system located near the Aero Scientific property say that about 3,000 pounds were removed from that location, and some part of that was from Northrop, wouldn't that indicate that at least 16,000 pounds of other VOC soil contamination is unrelated to Aero Scientific, it's related to Northrop's activities at the site?

A Well, it appears likely that the VOCs that were not released at Aero Scientific, at least the

vast majority of them that have been recovered by the system, were released at the Y-12 site.

Q And there was a discrete SVE system that dealt with the portion of the Northrop Y-12 property that is in the vicinity of the Aero Scientific, correct?

A I do not know that to be a separate system.

Q Don't you have separate mass estimates for removal?

A No, I have a total for the Y-12 site that's broken down into the SVE and the dual-phase extraction systems.

Q So what portion of the total amount of VOCs would you attribute to Aero Scientific out of the approximate 19,000 pounds?

A I would estimate on the order of a third in round numbers looking at the soil vapor testing results.

Q With Northrop being the remaining two-thirds?

A Yes, approximately.

Q Is there any other site in the entire project area that you are aware of that had as much as 14,000 pounds of VOCs in the soil?

A I haven't quantified the mass of VOCs that

are present at each site as part of my expert assignment. But based on the groundwater plume configurations, I think it's safe to say the answer to that question would be yes.

Q Tell me what site you believe had a larger mass of VOCs in the soil above groundwater than Northrop --

A I haven't --

Q -- Y-12.

A I haven't quantified that on a site-by-site basis.

Q On a qualitative basis, can you tell me what site you believe is more contaminated than Northrop Y-12 with VOCs?

A I haven't been asked to do that for specific sites.

Q But you've been working on this project for how many years now?

A Four or five years.

MR. SLOME: Objection; argumentative.

BY MR. MILLER:

Q And over the four or five --

And today you brought with you about a dozen banker's boxes full of paper?

A I believe more than that.

Q And those are your files concerning your work on this case?
A Yes.
Q How many boxes?
A I can count them.
I would say approximately 28.
MR. SLOME: You may have missed some. But if you want him to specifically count them and you want a precise number, we can do that.
MR. MILLER: No, that's okay. For my purposes that makes the point. I don't know that 29 would be materially different.
Q Mr. Tofani, based on all of the work you've done on this case, can you tell me any site you have any reason to believe has more VOC contamination in the soil above groundwater than Northrop Y-12?
MR. SLOME: Objection; beyond the scope.
THE WITNESS: I can tell you I believe several such sites exist based upon the groundwater plume maps that have been prepared by OCWD and others, but I have not been tasked with identifying those sites and quantifying the volume or the mass of contamination that's present as part of my expert assignment.
BY MR. MILLER:

Q Today you gave me a page that was prepared by The District. Is that -- that may not be the most current.

If you could take a look at the maps you indicated came from The District, which are in this pile -- I'm trying to take off the overburden.

A That's this group here.

Q Yes.

If you could pick out the most representative District plume map that you are referring to, the most representative and current.

A The one on top looks to be the most current. It was apparently last updated December 2008.

MR. MILLER: We'll mark that as Exhibit 5.

(Plaintiff's Exhibit 5 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q What plume are you referring to which you believe indicates that there's a larger mass of VOCs than the approximate 19,000 pounds on Northrop Y-12's property in the vadose zone; that is, the soil above groundwater?

A There are larger, if you will, plumes drawn at several locations on this map relative to the Y-12

site, which is actually located near the middle of one of the intermediate-sized plumes.

Q And what plume are you referring to?

First of all, what is the site nearest its upgradient extent?

A As far as the intermediate plume goes?

Q Do you have some way of naming the plumes on this map or characterizing them by location?

A I suppose we could number them.

Q There's the easternmost plume, which appears to be sometimes called "the northeast finger." Are you familiar with that area?

A Yes.

Q Does it basically start near the Microdot site?

A That's my recollection, yes.

Q Is that plume larger than the Y-12 -- well, strike that.

Do you have a reason to believe that the mass of VOCs in groundwater that created the northeast plume we just discussed is the product of having more VOCs in the soil above groundwater than Y-12?

MR. SLOME: Again, beyond his scope.

THE WITNESS: I believe the area of the plume

that you reference as the northeast plume is at least as large and probably larger than the area of the plume that's mapped here downgradient of the Y-12 site.

BY MR. MILLER:

Q Does the fact that the plume map, which represents the current known extent based on data, is smaller mean to you that the amount of VOCs in the soil that created the larger plume is probably greater?

MR. SLOME: Same objection.

THE WITNESS: I'm sorry. Could you read that back?

BY MR. MILLER:

Q I'm just trying to find out if you're using a working assumption that the larger the plume in its geographic extent, you believe that indicates it's more likely that that plume was created by more VOC mass in the soil than a site with a smaller plume shown on the same map.

A I believe there's going to be a general correlation between those two, given similar soil conditions. If you have two sites that are further removed with different soil conditions, that correlation gets a lot looser.

Q Is there any other plume that you can point to -- we'll work on identifying it once you tell me the area you are in -- that you believe is larger than the plume created by Y-12?

A Although it's drawn at a somewhat smaller size on this map, I believe the AC Products plume was certainly larger at one point in time. And then there's another plume shown to the north of the Y-12 site on this map that is considerably larger as well.

Q And at what site does that plume begin, more or less?

A The one to the north?

Q Yes.

A I don't know off the top of my head.

Q You prepared some maps. Would this document assist you in answering my question?

A Yes, potentially.

MR. MILLER: All right. Let's mark that as Exhibit 6.

(Plaintiff's Exhibit 6 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Please identify the map.

MR. SLOME: That's yours. You take that one.

THE WITNESS: The title block says "Site Plan with Plume Configuration and PRP's (sic)."
BY MR. MILLER:
Q And what is the date?
A July 2008.
Q Can you use that document as a guide to identify the site at the upgradient end of what you are calling the northern plume?
A There's more than one site identified on this map, but it begins in the general area, as is drawn here, of MAG Aerospace, Kryler Corporation and Western Roto Engravers it looks like. Although the original is in color and this is black and white so it's hard for me to correlate the legend with the black and white dots.
Q Is that also in the vicinity of CBS Fender?
A You are referring to the northern plume still?
Q Yes.
A Not that I can tell from this drawing. I don't see that site near the head of that plume.
But again, it's hard for me to read the numbers on this copy.
Q Do you have a better map that identifies sites than the one I've given you?

A Yes, but not with me.
Q I have a labeled aerial photograph prepared by GeoKinetics. Is this one more helpful?
A This original was in color also and the problem is there's two separate sets of numbered sites, and in black and white they both look the same.
Q I won't mark that then.
A That's the same issue that I'm having with Exhibit 6, the original was in color and it makes it difficult not only to read the numbers at this scale but to differentiate between the two colors.
Q Have you prepared any narrative or summary or notes that tells you what sites you consider to be part of that plume?
A No. That's beyond my scope.
Q Okay. Is there any other plume that you believe is larger than the Y-12 plume and therefore is likely to be a source of a larger mass of VOCs in the vadose zone than Y-12?
A Well, as Exhibit 5 is drawn, I believe the plume that Y-12 lies within that originates to the east of Y-12 is larger than the Y-12 sub plume, if you will, or the Y-12 portion of that plume.
Q And what site or sites are at the upgradient

end of that portion of the plume? And give it a name, please.

Is that kind of the middle plume?

A I suppose we could call it the middle plume.

Q If you've got a better name, I'm all for it, but --

A Could I see the Exhibit 6 again?

Q Of course.

A Oh, sorry. Got it.

It looks like the way OCWD has drawn that plume that it's beginning in the general area of the Fullerton Business Park.

Q Do you have any opinions on whether or not there are any sites upgradient of Y-12 that contributed to the plume at Y-12?

A Yes.

Q What sites contributed?

A I haven't attempted to identify all of the sites that contributed to the plume at Y-12. I've simply noted that there's VOC-impacted groundwater that's flowing onto the Y-12 site from upgradient sources.

Q Have you identified any of the sites that contributed to the contamination coming from upgradient sources onto the Y-12 site?

A Yes.
Q And is Kester Solder one of them?
A Yes, I believe so.
Q Kester Solder is a source of PCE coming onto the Y-12 site; is that correct?
A Yes.
Q What else?
MR. SLOME: I don't know what --
BY MR. MILLER:
Q What other sites have you identified that contributed to the contamination coming onto the Y-12 property from upgradient sources?
A I simply identified that there are other sites in addition to Kester. It has not been within my scope to attempt to identify the specific sites.
Q Didn't you need to know the specific chemicals associated with a site to determine if they were a source to Y-12?
MR. SLOME: Objection; vague, ambiguous, unintelligible.
THE WITNESS: From the available data I'm able to determine what chemicals are migrating onto the Y-12 property from upgradient areas, but I don't need to know which sites those chemicals are originating from to determine that there are upgradient sources.

BY MR. MILLER:

Q Was every site tested for 1,4-dioxane?

MR. SLOME: What do you mean "every site"?

BY MR. MILLER:

Q Every site in the project area tested for 1,4-dioxane.

A You are talking about thousands of sites in the project area?

Q I don't think there are thousands. Maybe you do.

A How are you using the term "site"?

Q Do you have a site list? At the bottom of the map we marked as Exhibit 6, there's a list of sites.

A There's a list of PRPs that have been named in OCWD's first amended complaint and there's an alphabetical list of some possible supplemental PRPs.

Q Do you have a more current and complete list than that one?

A I believe so, yes.

Q And do you have it on an exhibit with you today?

A No.

Q A document with you today?

A No.

Q If there is no site known to have released a chemical that is found on the Y-12 site, there's no site known to be upgradient that released that chemical, doesn't that tend to indicate to you that Y-12 may be the source?

A Well, I think if you find whatever chemical we're talking about present upgradient of the Y-12 site, that suggests that there is one or more sites upgradient or to the east that released that chemical.

Q So Kester is the only upgradient site you are prepared to identify for the Y-12 property?

MR. SLOME: Objection; argumentative.

BY MR. MILLER:

Q Correct?

A I'm prepared to say there are sites upgradient of Kester which have contributed to the contamination at Kester and which have contributed to the contamination at Y-12.

Q What sites are those?

A But I haven't identified the specific sites.

Q You don't have a clue what they are?

MR. SLOME: Objection; argumentative.

THE WITNESS: It's beyond the scope that I was asked to cover.

BY MR. MILLER:

Q Weren't you asked not to cover the subject of what specific sources are the source of upgradient contamination?

A I was told that that was being addressed by another expert and that I did not need to address it.

Q Who?

A Who is covering it?

Q Yes.

A I believe Dr. Lambie is covering that topic.

Q Are you going to testify concerning what remediation, if any, needs to be done at the EMD site today?

A Yes.

Q Does any groundwater remediation need to be done with respect to any plume caused by the EMD site?

A No.

Q Was the EMD site a source of releases of 1,1,1-TCA to the subsurface?

A Yes.

Q And you would expect that once that chemical's released to the subsurface it could break down and create 1,1-DCE; is that correct?

A If it became dissolved in groundwater, yes.

Q And you would expect it to rapidly break down from 1,1,1-TCA to DCE under those conditions, correct?

A I don't know if I would describe it as a rapid reaction.

Q What is the half-life of 1,1,1-TCA when it comes into contact with water?

A I can check my notes, but I believe it's approximately eight years. It's temperature dependent. I thought I might have brought a printout with me that listed that half-life. I don't see it. But I believe it's approximately eight years at about 21 degrees C.

Q Is that the appropriate temperature for groundwater?

MR. SLOME: Objection.

What do you mean "appropriate"?

BY MR. MILLER:

Q What is the appropriate temperature for groundwater in this area? If you were going to ask yourself what is the average temperature of the groundwater, what would the answer be?

A Between --

I believe the average is between 20 and 21 degrees C based on OCWD's data. If I recall

correctly, in the area of EMD I believe the average was 20.3 degrees C.

Q Other experts have testified that the half-life of 1,1,1-TCA when it comes into contact with groundwater is about one year and it would then -- half of it would break down into 1,1-DCE.

Do you disagree with them?

A I would need to check the printout where I printed out the concentration as a function of time. I can do that over a break. If I didn't bring it with me, I can have someone find that and confirm that.

Q You don't have this available on a laptop with you today?

A No.

Q Are you familiar with a methodology that can be used to estimate the age of a plume involving trichloroethane, TCA --

A Yes.

Q -- by comparing the ratio of TCA to DCE?

A Yes.

Q Could you describe a paper or papers that have described that method or give it some name?

A That's generally referred to as the hydrolysis of TCA into DCE. There are more than one

papers that have been published on the topic and studies that have been done that document the transformation rate.

Q And do you believe the scientific data is such that you can use the transformation rate of TCA to DCE to accurately estimate the age of the plume in contact with groundwater?

A Again this goes beyond the scope of my expert assignment, but yes.

Q Can you give me an example of a published paper that describes a methodology that's appropriate to estimate the transformation of those two chemicals using hydrolysis principles?

MR. SLOME: I'm sorry. I need to have the question reread.

(The record was read as follows:

"QUESTION: Can you give me an example of a published paper that describes a methodology that's appropriate to estimate the transformation of those two chemicals using hydrolysis principles?")

MR. SLOME: Objection; assumes facts, vague, beyond the scope.

You can answer.

THE WITNESS: I've seen more than one paper. The one that comes to mind is a publication by, as I recall, a couple of fellows from Exponent.

BY MR. MILLER:

Q Names, please.

A I don't recall their names off the top of my head.

Q Basically the way the principle works is if the ratio of TCA to DCE is low, that is, DCE is more abundant and TCA is less abundant, that tends to indicate the plume is older, correct?

A Yes.

Q It's been in groundwater longer?

A Yes. All based on the premise that the sole source of the DCE is TCA and there's not a separate source of DCE.

Q Okay. Is there any separate source of DCE at the EMD site that you are aware of?

A No.

Q The Y-12 site that you are aware of?

A No.

Q The Kester Solder site that you are aware of?

A No.

Q The Crucible site that you are aware of?

A No.
Q Is it your opinion that Northrop's activities at EMD caused 1,1-DCE to be present in groundwater at the site?
A Not that I have been able to identify, at least not at detectible levels. If you are talking about somehow a molecule of TCA making it to groundwater or there being trace-level contributions, I don't believe that can be precluded based on the available data. But I believe the available data indicates that there has not been significant perceptible contribution by releases at EMD.
Q Historically, weren't there samples taken at the EMD site where the concentration of 1,1-DCE was multiples of the maximum contaminant level for that chemical?
A Yes.
Q What table are you looking at, or report are you looking at?
A I'm looking at the figures for the EMD summary report, the 11-by-17, contains Attachments A, B and C.
Q It's entitled "EMD Site Assessment Summary"?
A Yes.
Q "March 13, 2012"?

A Yes.
Q And what figure?
A A-1 and Figure A-5 as well in response to your question.
Q These are graphs, and although I can obviously read the concentrations on the graphs, do you have a table of groundwater quality data for the EMD site that addresses my question?
A Yes, I believe that I do. It would be in one of the boxes over against the wall.
Q Basically your graphs that you just identified show concentrations of DCE in groundwater as high as 140 parts per billion at the Northrop site?
A Well, for Figure A-5, which is monitoring well MW-4, it looks like the peak would have been approximately 155 micrograms per liter.
Q Or parts per billion?
A Yes.
Q Isn't that concentration attributable to Northrop's activities at the site?
A I don't believe so, no.
Q Was DCE present in soils at the EMD site at levels high enough to create that concentration in groundwater?

A I'm looking at Table 2 in the summary report which lists the measured soil DCE concentrations prior to closure.

Locally at shallower depths, yes. As I'm looking through the 35 pages of testing results, I don't see anything at depth or that would indicate that the DCE concentrations at depth were sufficient to create that concentration in groundwater.

Q Let's go to page 11 of 35.

A Yes.

Q Concentration of TCA in soil that can break down into DCE in water was above 4,000 parts per billion in D-4?

A Yes.

Q At depths below 30 feet?

A Yes, 32 feet.

Q And the concentration of DCE was 4600 parts per billion?

A Yes, at 32 feet.

Q And are you claiming concentrations in that range cannot cause 155 parts per billion in groundwater?

A They could if they were present at the depth of the groundwater table. But this is at a depth of 32 feet, and the depth of the groundwater that we're

talking about for MW-4 was 177 feet.

Q Was there any contribution of DCE to groundwater at the EMD site?

A Nothing that is perceptible, I believe, based on the available data.

Q Isn't it a fact that the consultant retained by Northrop admitted that Northrop at the EMD site caused DCE contamination of groundwater in reports submitted to the Regional Board?

A I don't recall that.

Q Would that make any difference to your opinions?

A I don't think so, but I would have to look at that statement in the context in which it was given to answer with certainty.

Q And can you tell me what the source is of 155 parts per billion of DCE in groundwater under the EMD site?

A That appears to be coming from upgradient locations.

Q What location?

A It appears to be coming from a location in the vicinity of the Crucible site.

Q What does "in the vicinity of Crucible site" mean? Does that mean it's Crucible and others or not

Crucible?

A That means it looks like it's originating in the area of where the former Crucible operations were.

Q And what is the distance between Crucible and EMD?

A Do you have the --

MR. SLOME: What are you looking for?

THE WITNESS: -- assessment EMD summary?

MR. SLOME: Yes.

THE WITNESS: Thanks.

MR. MILLER: We're going to have to go off the video record while the witness looks for the answer. We're running out of tape.

THE WITNESS: I think the fastest way for me to do that --

MR. MILLER: Hold on, please.

THE VIDEOGRAPHER: We're going off the record. The time is 11:54.

(Off the record.)

THE VIDEOGRAPHER: This now begins disk number 2 in the deposition of Glenn Tofani. We are now back on the record. The time is 11:58.

THE WITNESS: Approximately one mile.

BY MR. MILLER:

Q Do you have any estimate of what the TCA/DCE ratio would be if the contamination originated from a site one mile away?

MR. SLOME: Objection; beyond the scope.

THE WITNESS: I can estimate that from the summary table that I was looking for previously, but I don't have it in front of me. I can track that down over the next break if that would be helpful.

BY MR. MILLER:

Q Please. I would like you to get that and the half-life for TCA in water.

A It's the same reference.

(Plaintiff's Exhibit 7 was marked for identification and is attached hereto.)

MR. MILLER: Let me show you Exhibit 7 to this deposition. It's dated September 18, 1995, signed by Gerald Thibeault, concerns the Y-12 facility.

And basically it says that "The Regional Board will not require further soil remediation actions at the site."

BY MR. MILLER:

Q This is what's known as a no further action letter, correct?

A Yes, with respect to the soil.

Q And this letter was written based on a request by Northrop to obtain a no further action letter from the Regional Board, correct?

A That's what it states in the opening paragraph.

Q And after this no further action letter was granted, Northrop went back years later and removed about 19,000 pounds of solvents that are regulated by the state, correct?

A Yes.

Q Doesn't that suggest to you that the original investigation by Northrop was inadequate as of 1995?

A Certainly the early or initial phases of the investigation did not identify the soil contamination, but the investigation was continuing to occur as of the time of this letter, and even after the time of this letter, and ultimately subsequent phases of the investigation did discover the presence of that contamination.

Q And what year did the subsequent phase of investigation begin that led to this discovery?

A I don't know if the investigation ever stopped. It was ongoing. This letter did not terminate the investigation of the Y-12 site. There

was continuing investigation even after the submission of this letter.

Q Basically of the groundwater?

A Yes.

Q So when did they start investigating conditions in the soil after this letter that led to additional remediation of the soil?

A Looking through my chronological notes, the first soil-specific investigation I see following this letter was in January of '97, although there were ongoing groundwater investigation activities prior to that that involved some soil sampling as well.

Q Well, if I recall correctly, you indicated that soil vapor extraction at this site didn't commence until August of 2008.

Are you suggesting that they identified the need for soil vapor extraction because of soil contamination by January of '97?

MR. SLOME: Misstates the prior testimony and misconstrues the answer to the question and the prior question.

MR. MILLER: Fine.

THE WITNESS: No.

BY MR. MILLER:

Q When did they start SVE at the Y-12 site?
A In August of 2008.
Q In January 1997 did they discover conditions, namely VOC contamination in the soil, that indicated there was a need for SVE work?
A VOC contamination in the soil was identified in January of '97 but not to a degree that would warrant SVE.
Q So when did they discover contamination in the soil at Y-12 following 1995 that indicated they needed to do soil vapor extraction work?
A You're limiting your question to soil data or to just data in general that led to the conclusion that SVE was warranted?
Q I'll expand it to data.
A Okay. Looks like by October of 2004, which is a point in time where a preliminary remedial action plan was prepared for the site by URS that propose SVE.
Q Is it fair to say that if you reviewed the Regional Board file between 1995, when the no further action letter was granted for the Y-12 site, and October 2004, it looked like the soil had been remediated to the degree it needed to be done at Y-12?

A I wouldn't necessarily reach that conclusion. During that time period, it was a fairly extensive groundwater remediation that was being undertaken by the Northrop consultants at the direction of the Water Board. And that was the focus during that time period based on the directives from the Water Board, was to define the extent -- nature and extent of the groundwater contamination; and once that was done, then they shifted into a source removal phase, if you will.

Q But that investigation was based on the problem that was going on at -- strike that.

During the period of time between 1995 and October 2004, they were focusing on what they thought was the residual effect in groundwater past soil contamination having solved the soil problem, correct?

MR. SLOME: Objection; it assumes facts, misstates the record.

THE WITNESS: I don't know that that's necessarily the case. I think as the groundwater investigation was completed, and certainly in the latter stages of the groundwater investigation, it became evident that there were VOCs originating at the site that were continuing to impact groundwater.

BY MR. MILLER:

Q And when you say the latter stage, are you talking about basically during the year 2004?

A No. I wasn't trying to be that specific with respect to time. But after enough wells were installed in the ground and monitored on a quarterly basis for a number of years, the data, the compilation of data from those wells I think led to the conclusion that the site was continuing to contribute VOCs to groundwater and that, in turn, would have led to the conclusion that there were VOCs remaining in the soil that were migrating to groundwater.

MR. MILLER: Let's take our lunch break.

THE VIDEOGRAPHER: We're going off the record. The time is 12:09.

(Off the record.)

THE VIDEOGRAPHER: We are now back on the record. The time is 1:15.

(Plaintiff's Exhibit 8 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q What is Exhibit 8?

A This is a site assessment summary for the

Y-12 property. It presents in summary fashion what my expert assignment was, the scope of work that was undertaken to complete that assignment, and then it lists the primary findings and conclusions that I reached in that regard.

Q And you personally prepared it?

A Yes.

Q You are the sole author?

A Yes.

Q And it's the single most complete summary of your opinions that are site specific and related to Y-12, correct?

A I believe so, yes.

(Plaintiff's Exhibit 9 was marked for identification and is attached hereto.)

MR. MILLER: Then Exhibit 9, which was also produced today, is a larger report containing a more detailed discussion on the same subject.

THE WITNESS: More detailed, somewhat less opinion related, more factual.

(Plaintiff's Exhibit 10 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Okay. And let me show you Exhibit 10. This is an appendix to Dr. Waddell's report, Appendix C13, specifically relating to Northrop Y-12.

Did you review this?

A If this was included in his report, yes.

Q Does this appear to be the copy you reviewed in the past?

A It does.

Q Did you review it in some detail to check it for accuracy?

A I would say I probably spent half an hour reading it to see what his opinions were regarding the Y-12 site.

Q Please turn to page -- take me just a second to find it. I've got too many flags on this document. Page 8.

A Yes.

Q There's a section beneath "Wastewater," the last paragraph, it gives "Toxic Release Inventory records for the period 1988 to 1994."

Are you familiar with that system for reporting emissions?

A Air emissions, yes.

Q It indicates that over that period, 158 tons of TCA over a seven-year period were released to the

air and an average use of 29 tons per year of TCA at the Y-12 site.

Do you have any reason to believe that information is inaccurate?

A No.

Q They did use very large quantities of TCA at this facility, Y-12, correct?

A That's consistent with my understanding.

Q Could you describe the dimensions of the tank that contained TCA?

MR. SLOME: You mean the physical dimensions?

MR. MILLER: Yes.

THE WITNESS: The documents I've seen identify the vapor degreaser as consisting of a steel tank 10 feet in width, about 40-feet long. They refer to it as having a 500-gallon capacity, which suggests obviously a very thin layer of liquid TCA within the tank. It was located within an 8-foot deep concrete pit within the building. There were grates installed around the perimeter of the tank at floor level so personnel could walk up to and access the tank.

BY MR. MILLER:

Q The containment structure around the tank was unlined and unsealed; is that correct?

A It was concrete. I don't know if it was

sealed concrete.

Q Do you have any evidence that it was ever sealed?

A I don't recall seeing any.

Q Is concrete something that can be penetrated by a solvent and corroded by a solvent?

MR. SLOME: Objection; compound.

THE WITNESS: Penetrated or corroded?

BY MR. MILLER:

Q Well, take penetrated.

A It depends to some degree on the mixture of the concrete. High strength, low water-to-cement ratio concrete is relatively impermeable. Low strength, high water-to-cement ratio concrete is somewhat porous.

Q Do you know which this is?

A No.

Q If you turn to Mr. Waddell's report, Exhibit 10, page 5 --

A Yes.

Q -- second bullet under "Site Operations," "Vapor degreasing. The vapor degreaser was large, with dimensions of 'approximately 36 feet by 4 feet by 8 feet deep,' and located in a concrete pit (approximately 43 feet by 12 feet by 10 feet deep)

intended to 'contain spills or leaks that may occur from the vapor degreaser.' During a preliminary environmental facility assessment in 1992, the pit could not be inspected because a respirator was required to enter it."

You see the statement?

A Yes.

Q Is that a facility which can have spills and leaks in your experience?

A Yes.

Q And the fact that the pit couldn't be inspected because you needed a respirator suggests that spills had occurred, correct?

A No, not necessarily.

Q Explain.

A The pit -- or a pit of that configuration with limited access for entrance and egress would generally be considered a confined space, contaminated or uncontaminated. So they may simply be referring here to normal precautions that would be exercised for working in a confined space. I don't think it's necessarily an indication that there were high vapor levels within the pit.

Q If there were no vapor levels, they could certainly enter the area without a respirator, right?

A Perhaps not safely, if it was a confined space.

Q Turn to Section 4, page 11, "Evidence of Releases."

A Yes.

Q Did you review this?

A I have seen this before, yes.

Q And at the beginning of the second paragraph, it states "Based on historical reports, the pit for the degreaser and still was uncoated and unlined," citing a document.

Does that refresh your memory?

A I don't recall seeing a document that described it as uncoated and unlined, or vice versa.

Q Is it your understanding that the TCE still leaked liquid onto the floor of the building and into the degreaser pit as described in the next sentence?

A Yes. That's identified in my summary report for the facility as well.

Q And also that drums containing TCE were stored in the pit and reportedly ruptured and leaked?

A Yes.

Q That happened, right?

A It's reported to have happened in the documents that I reviewed.

(Whereupon Ms. Thompson entered the proceedings.)

BY MR. MILLER:

Q If you turn to page 12, second paragraph from the bottom, "The three-stage clarifier released untreated water directly into the sewer prior to 1985, and directed the water into the pretreatment system after 1985. The clarifier itself was reported to be corroded and unlined. Thus, releases would potentially have occurred directly to the sewer from the clarifier prior to 1985, and also from the bottom of the clarifier due to the corrosion and lack of protective lining."

Do you agree with the statement?

MR. SLOME: Which statement? You've read an entire paragraph.

THE WITNESS: With respect to the last sentence, the first half, yes. The second half, not necessarily.

And with respect to the first half, I don't know if I would refer to it as "release" since he's describing something being discharged to the sanitary sewer system. I would tend to characterize it more as a discharge to the sewer system than to suggest it was a release to the environment.

BY MR. MILLER:

Q Did you review the documents concerning how they used the clarifier and sewer at this location?

A Yes.

Q What did they do to remove scale from the pipe that led from the clarifier, namely the sewer lateral?

A They used caustic chemicals initially and then at some point changed the process when they had an issue, I believe, with blockage of the system.

Q They were putting acids and caustics down the sewer pipe, correct?

A I believe that's correct.

Q And there's evidence that, as a result of the combined effects of caustics and acids, that sewer line deteriorated, correct?

A I'm looking for the specific notes that I have regarding that, but if it --

Q If it helps you, Mr. -- I'm sorry, Dr. Waddell discusses the subject I just went over in the last paragraph on page 12.

A I'm looking at my notes regarding a Phase 1 PSA for the property dated July 1994 that refers to lime being used to neutralize the wastewater and issues they had with scaling requiring frequent

cleaning of the line.

Q Did you look at the pictures of the sewer pipe in this area?

A No. I don't recall seeing pictures of the sewer pipe.

Q Do you know what Dr. Waddell is referring to when he states, page 12, last paragraph, last three lines, "When excavated these lines were found to be seriously deteriorated," citing a Northrop Grumman document?

A I don't recall seeing a notation to that effect, no.

Q Or pictures to that effect?

A No.

Q If you assume that the sewer line was seriously deteriorated by the descaling and the associated use of caustics and acids in this sewer line, wouldn't a discharge to the sewer line be a discharge to the environment?

A If the sewer line were leaking, I would expect some amount of the effluent to the sewer line to potentially seep into the soil.

Q Isn't the clarifier and sewer system a known source of releases to the environment at Y-12?

A Based on what I've seen, I would

characterize it as a potential source.

(Plaintiff's Exhibit 11 was marked for identification and is attached hereto.)

MR. MILLER: Exhibit 11, "Summary of Site Investigations," Smith.

We will come back to Dr. Waddell's report.

Q Are you familiar with this report?

A I have seen it, yes.

Q And you reviewed it as part of your work in this case?

A Yes.

Q You cited to it in your materials?

A Yes.

Q I'm going to ask you about sampling at the clarifier we just went over, the one where they descaled.

Did you notice when you reviewed the document that although they did a soil boring at the area of the clarifier known as NC-23, they didn't analyze the sample for VOCs although they analyzed every other sample for VOCs?

If you turn to Figure 3.

MR. SLOME: What page?

MR. MILLER: Figure 3. Figures don't have page

numbers, they have figure numbers.

THE WITNESS: Yes.

BY MR. MILLER:

Q If you look at about the middle of the building you will see NC-23.

A Yes.

Q And you can see the trench and item 23 is the three-stage clarifier.

Do you see that?

A Yes.

Q So NC-23 would be the sample taken closest to the clarifier and sewer lateral where the discharge occurred from the building; is that correct?

A You are talking about the discharge to the sewer line?

Q Yes.

A Yes.

Q If you look at Figure 10 --

A Yes.

Q -- it posts the soil analytical results for the Y-12 facility, and opposite every NC sample there's a data table and NC-23 is the only one without a data table.

Do you see that?

A It appears there are other borings that don't have data tables, if that's what you are asking.

Q They certainly took no samples for VOCs at NC-23, correct?

A I was looking for the laboratory analytical results. I can't tell without looking at those or without looking at a summary table. There's none posted on Figure 10.

Q If you look at Table 1, "Soil Analytical Results," you will see that they tested for TCE in every boring except NC-23, which is not listed in the table.

A I see other borings that they did apparently not test for VOCs at but NC-23 is one of them, it does not appear to be listed in this table.

Q Isn't that an area that should have been sampled?

A I would say it would -- well, I believe it was sampled.

Q Should have been sampled for VOCs.

A I would say it would depend, in part, upon what they found when they sampled it. If there's an indication of elevated VOC levels there based on OVA readings, then yes, certainly.

Q Is there any indication that they were screening samples to test or not test based on OVA readings?

A I see where they were taking OVA readings.

Q Anything else?

A Well, I'm screening the text of the report. They indicate that "VOC impacted soils were encountered during drilling activities." So that suggests they were using the OVA, possibly visual olfactory evidence, to identify, to some extent at least, the presence of VOC impacted soils.

Q If you look at page 7, first -- if you look at the paragraph about halfway down on the page "The soil samples were analyzed for a variety of compounds, depending on the location of the boring and the previous use of the area." Then it lists EPA analytical methods, one of which is for VOCs -- two of which are for VOCs, correct?

A Three methods, yes.

Q So they were supposed to be taking samples based on knowledge of past use. Given what you know about the discharge to the sewer, shouldn't they have checked for VOCs when they sampled in the clarifier area and the sewer lateral area?

A If they had hits, OVA hits, when they were

screening the samples from that area, yes. In the absence of that, I would say not necessarily.

Q Take a look at the soil boring logs.

MR. SLOME: Page?

MR. MILLER: There are many pages.

MR. SLOME: Give us the Bates range.

I've got them.

THE WITNESS: Yes.

BY MR. MILLER:

Q I'm looking for the entry for NC-23. I managed to find the one for 20, but they don't appear to be in numerical order.

A It's in there, I saw it a moment ago. There it is.

It's Bates number ending in 1103.

MR. SLOME: Yes.

THE WITNESS: I believe there's a second copy of it as well ending with Bates Number 1151.

BY MR. MILLER:

Q Weren't VOCs found in an area near this later?

A Let's look at the soil vapor survey results '87, '88 -- I'm sorry, 2007, 2008, and it shows -- certainly doesn't show that to be a hot spot, if you will, but there are some elevated vapor levels once

you get down to depth below the depth that was explored at the time of their investigation in '95.

Q Is this the Smith report of September 20, 1995 you are referring to, the groundwater sampling?

A No. I was referring to the Ninyo & Moore soil vapor survey results from 2007, 2008 to see if there is an indication of significant contamination at the clarifier location that we're now discussing.

Q Didn't the report that you just referred to demonstrate that there was soil contamination along the path of the sewer lateral?

A That's not evident that I see from the data, no.

Q What are you looking at?

A The 19- -- or the 2007, 2008 Ninyo & Moore soil vapor testing results.

Q And you have that depicted on a figure?

A Yes.

MR. SLOME: Is that document --

Does he have the document?

THE WITNESS: I don't know. This was posted to our FTP site last week.

BY MR. MILLER:

Q What is "this"? Is this the figure that posts the data?

A A series of figures from the -- I'll call it the 2007 soil vapor survey.

Q Is it in this compilation or a different compilation of documents?

A Different.

MR. MILLER: Let's go off the video record for a second.

MR. SLOME: Okay.

THE VIDEOGRAPHER: We're going off the record. The time is 1:43.

(Off the record.)

THE VIDEOGRAPHER: We are now back on the record. The time is 1:35.

(Plaintiff's Exhibit 12 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q During the break I handed you Exhibit 12, which is entitled "Pre-Design Investigation Report Cleanup and Abatement Order No.," et cetera, "Former Northrop Grumman Y-12 Facility" by Ninyo & Moore, May 9th, 2008.

Is this the report that you referred to earlier?

A Yes.

Q Did you check soil sample data to see if there was contamination along the sewer lateral line coming out of the Y-12 building?

A Soil sample data as far as soil vapor levels, yes.

Q Did you post that on a figure, the data from this report on a figure?

A Yes, a series of figures.

Q And can you identify where that appears in your records?

A It was posted to our FTP site for download last week.

Q What is the name of the figure that you are looking at, the figure number, the date and any name?

A It says "Soil Vapor Survey Results for Y-12 Facility" and then there are a total of 20 figures.

Q What is the location of the sewer lateral coming out of the clarifier we've been discussing?

A Do you want me to identify it on the Smith figure or on a Ninyo & Moore figure?

Q What side of the building?

A The west side.

Q And basically does it run from the clarifier along the west side to a street?

A Yes, I believe so.

Q What street? That will help us identify what end of the building.

A I believe to Orangethorpe.

Q And have you checked to see whether or not the soil vapor concentrations in that area are higher closer to Northrop than to what you are calling Trilogy Plumbing or its predecessor --

A Aero Scientific.

Q -- Aero Scientific?

A Yes.

Q Isn't the pattern that the concentrations are higher closer to the Y-12 facility?

A The highest concentration at a shallow depth along that side of the building was measured on the Aero Scientific property.

Q Closer to the Northrop property than to the Aero Scientific building, correct?

A It's probably a few feet closer to the property line than to the Aero Scientific building, yes.

Q And it's in the immediate vicinity of the clarifier that we've been discussing?

A If we were to move to the east approximately 50 or 60 feet from the point where the highest total VOC concentration was measured, we would be in the

vicinity of the clarifier, it appears.

Q And we're in the vicinity of the pipe coming out of the clarifier, correct?

A Well, the point with the highest concentration is well to the west of that. If you move due east from that point, then you are in the vicinity of the pipe coming out of the clarifier.

Q If you look at Bates -- page 12 of Exhibit 12 --

A Yes.

Q -- you're claiming that the chemical released by Aero Scientific was PCE or TCE?

A Again I'm looking at the soil vapor results, it looks like it would include PCE and TCA and potentially TCE as well.

Q Well, let's see if Ninyo & Moore agree with you.

Page 12, Exhibit 12, Figure -- under section "Discussion of TCE Contour Maps," "Figure 9 illustrates the TCE concentration in the shallowest depth interval mapped, from 5 to 12 feet below ground surface. This figure shows a major soil vapor" -- "major shallow soil vapor TCE plume centered over sampling location SG-65 (13,000 parts per billion TCE) located near the former quench tanks. Two other

areas with elevated TCE concentrations are associated with sampling locations SG-05 (500 parts per billion TCE) on the eastern portion of the Trilogy Plumbing property and extending to SG-07 (470 parts per billion TCE) in the western driveway, and to the SG-17 (560 parts per billion TCE) location in the west-central portion of the EMPI building."

Do you see that statement?

A Yes.

Q Clearly it states that in the area of the samples that were conducted along the western boundary, the highest concentrations of TCE were near the former quench tanks that were known to have Northrop releases, correct?

A Yes.

Q Now let's turn to their analysis of PCE, page 14, Section 4.2.3, "Discussion of Tetrachloroethylene (PCE) contour maps." "Figure 14 illustrates the shallowest depth interval mapped, from 5 to 12 feet below ground surface, and illustrates a shallow soil vapor PCE plume centered over sampling location SG-05 (420 parts per billion PCE) located in the northeast corner of the Trilogy Plumbing property. The SG-65 sampling point located near the former quench tanks also has a comparatively

elevated PCE concentration (200 parts per billion)."

Do you see that statement?

A Yes.

Q Doesn't that indicate that the quench tank released PCE?

A I believe a small amount of PCE was released with TCE at the quench tank location.

Q Wasn't PCE used to clean out the quench tank?

A "P" as in Paul?

Q Yes. "P" as in Paul.

A No. I believe TCE was used to clean out the quench tank.

Q It then goes on to state that at the SG-65 location the PCE concentration couldn't be measured with a detection limit of 500 parts per billion because the TCE levels were so high, 12,000 parts per billion, it required a dilution factor of 500.

Do you see that?

A Yes.

Q Which means that it was very difficult to accurately measure the amount of PCE near the quench tank because there was so much TCE present, correct?

A Well, it indicates that the samples had to be diluted in order to make that measurement, but

that it was possible to make that measurement.

Q If you have to dilute 500-fold to measure the sample for PCE, that does raise the detection limit and increase the probability you will miss PCE that's present, correct?

A If it was present at a trace level, yes.

Q No.

Actually, if the detection limit is 500 parts per billion, you wouldn't call that a trace level, would you?

A No. But if it was present at a trace level, you would miss it.

Q This is saying that if it's 499 parts per billion, because of the dilution required to test the sample and interference with TCE, they couldn't tell you if it was there or not, right?

A It looks like they typically had a detection limit of 1 microgram per liter. So yes, if they diluted 500 times, they would be right at their standard detection limit.

Q What does the detection limit of 500 parts per billion on page 14 mean to you in terms of PCE? Doesn't it mean the laboratory would report as non-detect a concentration below 500?

A Possibly, or they may report it as a detect

and qualify it that it was below detection limit.

Q If you turn to page -- I'm sorry, Table 1, page 6 of 20.

MR. SLOME: Bates page?

MR. MILLER: 3213.

MR. SLOME: Thank you.

THE WITNESS: Got it.

BY MR. MILLER:

Q There's a section entitled "Tetrachloroethylene," or PCE, at the bottom that continues on for several pages.

A Yes.

Q Don't these data show hits outside the building and beneath the building of PCE that runs along the western boundary of the property, namely where the sewer lateral is located?

A The easiest way for me to answer that is to look at their contour maps that they generated from that data or to look at the contour maps that we generated from that data, and it does not appear to indicate a linear source area or a source area that would correspond with the alignment of the sewer line.

That's not to say that some of these sample locations are not in the vicinity of the sewer line,

but taken as a whole they don't appear to indicate the sewer line as a source.

Q Okay. Let's go to the TCE contours, please.

A Yes.

Q Figure 9, 5 to 12 feet below ground surface, TCE in soil vapor. All of the high contours start on Northrop property.

A The highest contours are on the Northrop property, yes.

Q And you have no information that TCE was used or released by Trilogy Plumbing or Aero Scientific, correct?

A Well, I think the data suggests that there was a release of TCE on the Aero Scientific property.

Q Are you looking at Figure 9, the shallow soil gas data?

A Yes.

Q Doesn't that show that the highest contours are on the Northrop property and it appears to extend from the Northrop property toward Trilogy Plumbing but literally no measurements under the Trilogy Plumbing building?

A There's no data under the Trilogy Plumbing building. The highest concentrations by far are on the Northrop property in the area of the quench tank.

Once you get away from that quench tank, it looks like there's a smaller source or a smaller release on the easterly portion of the Aero Scientific property.

Q What sample point are you referring to, if any?

A Looks like it's their sample point -- it's difficult to read at this scale, SG-05.

Q SG-05 is located closer to the Northrop property than Trilogy, correct?

A It's located on the Trilogy property.

Q It's within the 300 parts per billion contour that starts on Northrop's property and is dominantly located on Northrop's property, correct?

A The way the contour's drawn in Figure 9, the majority of the 300 microgram per liter contour is on Northrop's property.

Q And the 500 parts per billion in SG-05 is basically located where the sewer lateral is. It's the sample point closest to it, correct?

A Well, it's located on the Aero Scientific property, not the Northrop property.

Q It's where the sewer lateral is for Y-12.

A Are you suggesting that Y-12 sewer lateral extends across the Aero Scientific property?

Q I'm suggesting the sample point is closer to

the sewer lateral than anything else, just on the other side of the property line. The sample was taken close to the property line, correct?

A The sample was taken, I would say, approximately 20 feet, perhaps, from the property line.

Q And where is the sewer lateral?

A Extending along the west side of the Y-12 building which would be --

Q How many feet from the property line it shares with Trilogy?

A I would say approximately 20 feet perhaps.

Q So SG-05 is located within 40 feet of the sewer lateral, correct?

A If I go back to the Smith map, actually in scale the sewer line from the property line they show it about 53 feet from the property line.

Q Please turn to Figure 22 in the same series.

A In the Ninyo & Moore series or Smith?

Q Ninyo & Moore.

A Got it.

Q Witnesses from Aero Scientific testified they used 1,1,1-TCA, not PCE, correct?

A It's my understanding that they used 1,1,1-TCA, yes.

Q And if you look at Figure 21 it shows --
MR. SLOME: 22.
BY MR. MILLER:
Q Figure 21 --
MR. SLOME: Sorry.
BY MR. MILLER:
Q -- and 22, it shows elevated DCE concentrations on the part of their building furthest away from Northrop, correct?
A Well, it shows them for every point that was measured on their property.
Q If you look at Figure 22, the 1000 part per billion contour is located on the portion of the Trilogy property furthest away from Northrop.
A Yes. It looks like the highest concentration on the Aero Scientific property was measured on the west side of the property.
Q And if you look at any -- well, strike that.
Based on what you know about the use of the Trilogy building, is there a logical explanation why there would be a release at that area?
A It could be the location of a sewer line extending out to the street from the building, but I would say the data for Aero Scientific is too sparse to pinpoint the location of a source on that

property. It just indicates that a source is present.

Q If it just so happens they had a clarifier at that location or near it?

MR. SLOME: Just repeat the question.

BY MR. MILLER:

Q If Trilogy's/Aero Scientific's clarifier was located close to the 1000 part per billion contour, would that be consistent with your understanding of a potential release point at their building?

A I would say that 1000 contour is more likely associated with a release from the interior of the building or at a more distant location.

If you look -- looking at Figure 22, that's for 38 to 40 depth interval. If we were dealing with a release that was physically at that location, I would expect the concentrations to get higher at shallower depths.

What we see at that location, I'm looking at the TCA results, is lower concentrations that we get in the case of TCA down to the same depth interval, about 40 feet, and then you see a higher concentration. That's more suggestive that running into a release is moved laterally from an adjacent trace area than tracing one straight down from the

source.

Q Well, wouldn't you expect higher TCA concentrations near the surface and higher DCE concentrations as the chemical moves because it has to degrade into 1,1-DCE?

MR. SLOME: Assumes facts.

THE WITNESS: It depends if it was released in solution. But the infiltration rate is relatively rapid compared to the degradation rate, so I wouldn't necessarily expect to see a change in composition over a 20- or 30-foot vertical interval.

BY MR. MILLER:

Q All right. Now, let's go to PCE data, Figure 14.

A Yes.

Q The highest concentration on Trilogy property of TCE at that interval beneath the surface is a sample taken closest to Northrop's property with a concentration of 420 and away from the building formerly used by Aero Scientific, correct?

A Yes.

You are talking about at this particular depth interval?

Q That's correct.

A Yes.

Q Then if we go to 14 to 20 feet, at this depth the highest concentration is located on the other side of the building away from Northrop, correct?

A Yes.

Q Same location that had the high TCA concentration -- I'm sorry, DCE concentration?

A And TCA as well, all three.

Q If we look at the concentration of PCE at 21 to 25 feet, the highest concentrations are closest to Northrop and away from the boring on the other side of the property, correct?

A You're at Figure 16?

Q Yes.

A No. I believe the highest concentrations are still on the east side of the Aero Scientific away from Northrop. That would be the 450.

Q I see the 450, but there's a 500 contour that's physically located on Aero Scientific's property.

A Yes, although no data point that goes along with that. If you are asking about --

Q The reason is that the data points are on Northrop's property and they are extending the contour onto Aero Scientific showing that the source

is Northrop, correct?

A I don't think they are necessarily showing that the source is Northrop, but the highest concentration contour line that approaches the property would be from the Northrop side the way they've drawn it. The highest concentration that was measured physically on the Aero Scientific property is on the opposite side of the property, on the east side.

Q But it's less than as shown on the Northrop property in the area I just referenced.

A The 500 microgram per liter contour line approaches the Trilogy property from the Northrop side and on the opposite side there's a 450 microgram per liter maximum concentration measured out of two data points on the property.

Q Doesn't this show that there's more PCE on the Northrop property than on the Aero Scientific property the way they've contoured it?

A Not necessarily because they haven't completed the contours on the Aero Scientific property since there's only two data points.

Q Look at Figure 17. This shows that the PCE contours are basically located outside the Trilogy property, the high point, the 800 part per billion

contour in the center.

A Is located on the Trilogy property. In fact, it's entirely -- the center one is entirely -- almost entirely confined to the Trilogy property the way they've drawn it.

Q Does this data clearly show a pattern that the PCE contamination came predominantly from the Trilogy property?

A Well, the word "clearly" is the difficult part of your question.

I think the data suggests that the PCE came predominantly from the TCE -- or from the Trilogy site, although it generally is clustered close enough to the property line that it requires some interpretation to make that statement.

Q You make that statement despite the fact that at several levels beneath the surface the indication is that there's more on Northrop property than on the neighbor's property?

A I don't think that that is generally the indication.

Q Look at Dr. Waddell's report, Exhibit 11 --

I'm sorry, 10, is it?

MR. SLOME: Exhibit 10.

THE WITNESS: 10.

BY MR. MILLER:

Q Page 12.

A Yes.

Q He makes the point, at the bottom of page 12, that "The wastewater pretreatment unit was known to overflow" and that system was there from 1985 until it was upgraded in 1990.

Do you see that?

A Yes.

Q He also makes the point on the next page that the documentation indicates that the pretreatment system was intended to remove metals, not VOCs.

Do you agree?

A I would say that was its primary intended purpose, although if you look at data -- laboratory analysis of the VOC levels in water before and after pretreatment, the VOC levels appear to have been reduced by, you know, roughly half by the process.

Q He continues by stating that "Releases would potentially have occurred from the pretreatment system itself when it overflowed and also from the deteriorated sewer pipe, since the pretreated water would still contain VOCs."

Do you agree or disagree?

A With the first part of that statement, if the pretreatment system overflowed I would say that would represent a potential release of water containing what would appear to be low levels of VOCs based on available data. And I would characterize the sewer pipe as a potential source, again based on what I've seen to date.

Q If I showed you pictures of a deteriorated sewer pipe that literally had pieces missing and cracks, that would definitely be a source of release for whatever you put in the sewer, correct?

A If it was an open pipe along the flow line portion of the pipe that was conveying effluent, then yes, some effluent would likely have been released from that line if those photos depict its actual condition when it was in the ground.

Q At the end of the paragraph, Dr. Waddell states soil vapor and historical evidence indicate that site sewers were the likely source of releases, especially in the mid-'80s and early '90s. And he explains just before that, that the sewer he's talking about ran along the west side of the facility connecting with the main sewer line on East Orangethorpe.

Do you see that?

A Yes.

Q Now, he's describing an activity that could result in releases close to the property line with Trilogy, correct?

A Yes.

Q What activity on Trilogy's part would have released chemicals into the environment close to the Northrop property as opposed to on the other side of the building where the highest DCE concentrations occurred?

A Well, first of all, I don't know that the release was necessarily close to the Northrop property from the Trilogy Plumbing site. At most depths there are one or two measurement locations at the Trilogy Plumbing site. So you can very easily be looking at a release point underneath the building and you are simply seeing the effects of that at the points that were taken behind the building and at the front of the building.

Q I'm trying to find out what activity at what location caused releases at Trilogy.

Do you know?

A I don't know the specific activity. I know, I think as you mentioned earlier, maybe you didn't, that Trilogy used relatively large quantities of TCA.

I know there are elevated levels of TCA on the -- not Trilogy, I'm sorry.

Aero Scientific used relatively large amounts of TCA. I know there are elevated levels of TCA and other VOCs on the Aero Scientific property that suggests a source location on their property.

Q From what? How did the release occur?

A I don't know.

Q Where did it occur on their property?

A I would say most likely at more than one location. I think the data that exists suggests that there was likely a release from the facility, the building itself, based on the data that was collected around the perimeter of the building.

Also, if you look at aerial photographs of the facility that were taken during the '90s and the 2000s, the rear portion of that property looks like it was some sort of equipment yard. And it's got a lot of staining, very dark, grimy, if you will, appearance for their whole rear portion of the property. That appearance in and of itself suggests that there could have been some contamination associated with the activities that were taking place there.

Q Similar to the soil staining on the Northrop

property?

A Which soil staining are you referring to?

Q You are not aware of aerials that show soil staining on the Northrop property following spills?

MR. SLOME: Vague and ambiguous as to which Northrop property you are talking about.

THE WITNESS: I've seen references of staining on the Y-12 property that I believe referred to pavement, water stains on the pavement.

MR. SLOME: Can we just go off the record for two minutes?

MR. MILLER: Sure.

MR. SLOME: Thank you.

THE VIDEOGRAPHER: We are going off the record. The time is 2:21.

(Off the record.)

THE VIDEOGRAPHER: This now begins disk number 3 in the deposition of Glenn Tofani. We are now back on the record. The time is 2:27.

(Plaintiff's Exhibit 13 was marked for identification and is attached hereto.)

MR. MILLER: Exhibit 13 is a Cleanup and Abatement Order issued to Northrop Grumman for the Y-12 facility dated November 14, 2003.

Q Have you seen it?
A Yes.
Q Did you consider it in forming your opinions?
A Yes.
Q I was wondering, because in your Northrop Y-12 Site Assessment Summary, which I believe is Exhibit 8, you state at paragraph 32, "Northrop has made, and continues to make, a good faith effort to remediate the soil and groundwater contamination at the Y-12 site."

I think you mentioned something about working cooperatively with Regional Board.

Is that your opinion from reviewing the file?
A Yes.
Q Let's look at the Cleanup and Abatement Order, Exhibit 13, paragraph 15. I'm sorry, it's not 15. Just a second.

Didn't they explain in this order that they were somewhat unhappy with Northrop's cooperation at the time?
A There was a point in the investigation where the Water Board had asked for one or two additional fixed monitoring wells, as I recall, and the Northrop

consultant at the time was proposing Hydropunch sampling locations instead of fixed wells. And I think they went back and forth over a few-month period up to the point where the Water Board effectively ordered them to install wells and not use the Hydropunch sampling in lieu of fixed wells.

Q Basically Northrop declined to follow the Regional Board's requirements so they issued this order with respect to monitoring wells, correct?

MR. SLOME: Objection; misstates the document, argumentative.

THE WITNESS: Are you referring to the Cleanup and Abatement Order?

BY MR. MILLER:

Q Yes.

A No. I believe there was a separate letter that could be characterized as an order I think from the Water Board to Northrop regarding the monitoring well issue that I mentioned that directed them to install wells rather than to use Hydropunch sample at those locations.

This Cleanup and Abatement Order came after a couple letters from The OCWD to the Water Board in 2003 that immediately preceded this where OCWD was urging the Water Board to issue a cleanup and

abatement order. I believe that's what precipitated it.

Q If you look at paragraph number 4, I believe I found the entry I was alluding to.

The fourth line down, "As a result of Northrop's reluctance to install some of the downgradient monitoring wells, the Executive Officer issued Investigation Orders pursuant to Section 13267 of the California Water Code on two occasions, August 16, 2000 and April 21, 2000 (sic) requiring that the monitoring wells be installed."

You see that entry?

A Yes. 2001 on the second one.

Q Yes. Thank you.

And Northrop didn't comply with that so they issued this Cleanup and Abatement Order, correct, ordering them to do it?

A No. Northrop installed a monitoring well in response to the 2000 order. Northrop's consultant, they were proposing Hydropunch, the Water Board effectively said no, we want a well. That well, I believe, was installed in response to the Water Board's correspondence.

Q Please turn to page 2 of the order. In paragraph 6 they report the maximum detections of

certain compounds in groundwater associated with the site, correct?

A Sorry. I was still --

Q Page 2.

A -- looking at data in response to your last question.

Q Page 2, paragraph 6, there's a table. It shows the maximum detected in groundwater of listed chemicals.

MR. SLOME: Page 2 of the --

THE WITNESS: Yeah, I'm trying to get there.

I was just looking with respect to the second order you referenced previously, the April 2001, Northrop did install monitoring wells as requested in response to that order also. So both of those were complied with.

And I'm sorry, what was your next question?

BY MR. MILLER:

Q Page 2, paragraph 6 has a table.

A Yes.

Q PCE was found in groundwater at the site in concentrations as high as 400 parts per billion, correct?

A That's what it says, yes.

Q Do you have any reason to believe that's

incorrect?

A No.

Q TCE, 1700 parts per billion; is that correct?

A That's what it says, yes.

Q Is it correct that TCE was detected at this site at concentrations as high as 1,700 parts per billion by 2003?

A I can check the data and let you know if you want me to do that. I don't have the maximum measured concentrations memorized.

Q Is it fair to say that the maximum detections listed in this box, including those for DCE and TCA, are much higher than any upgradient source approaching the property in a monitoring well?

A It's fair to say that these concentrations are higher than the upgradient concentrations that were measured immediately to the east or on the east side of the property.

Q If you look at paragraph 8, fourth line, it says it is likely TCE is migrating onto the site from an offsite source. However, the concentrations of TCE in these onsite, upgradient wells are significantly less than the concentrations of TCE that have been detected in the onsite wells located

directly downgradient of the suspected source area, and significantly less than the concentrations of TCE which have been detected in groundwater samples obtained from soil borings at the site that were drilled at or downgradient of the suspected source area. Also, although PCE and 1,1-DCE are intermittently detected in the onsite monitoring wells along the upgradient boundary at concentrations generally less than 5 parts per billion, PCE and 1,1-DCE are consistently detected in the other onsite wells and downgradient offsite wells at significantly higher concentrations.

Do you see the statement?

A Yes.

Q Regional Board was making the point that the VOCs coming onto the property from offsite sources were significantly lower than what Northrop was contributing to the groundwater as shown by monitoring well measurements on their property, correct?

A I think they are making the statement that the levels of regional VOCs that are migrating onto the property, the Y-12 property, are lower than the peak concentrations that were measured downgradient of the suspected onsite source areas.

Q Do you agree or disagree with that?
A With the statement that I just said?
Q No. With the statement made by the Regional Board I quoted.
A You quoted several. Which one in particular?
Q That the TCE concentrations coming from offsite sources are significantly less than the amount of TCE in groundwater leaving the property directly downgradient of the suspected source area.
A Yes, I think that's a fair statement.
Q And also, that PCE and DCE are consistently detected in some onsite wells and downgradient offsite wells at significantly higher concentrations than any upgradient source.
A If they are limiting that statement to upgradient source as it approaches the Y-12 property and not just any upgradient source in general, that's a fair statement as well.
Q So during this period of time, the Y-12 property was a significant contribution to groundwater of TCE, PCE and DCE, correct?
A The -- I don't know if there's any question the property was contributing TCE levels to groundwater. The source or sources of the PCE, DCE

and TCA are not as clear.

Q You made the point that Trilogy Plumbing and Aero Scientific may have used TCA in what you described as significant quantities, correct?

A Yes.

Q I want you to compare that to the 29 tons per year used by Northrop of TCA.

How does it compare?

A I think the records I've seen for Aero Scientific is more on the order of 10 tons per year.

Q So wasn't Northrop using significant amounts of TCA that caused groundwater contamination with DCE?

A I don't think that's clear from the available data. Most notably, the soil vapor survey results that we spent the last hour discussing.

Q Isn't it clear the Regional Board at the time of this order disagrees with that opinion in paragraph 8?

MR. SLOME: Well, let me raise an objection.

The data that you are looking at is 2000 -- the Ninyo & Moore data is 2008.

MR. MILLER: I'm asking --

MR. SLOME: No, no. You are asking the witness

an unfair question. You are saying doesn't the Regional Board disagree with something that occurred 10 years after the Regional Board issued its opinion.

MR. MILLER: Fine. I will rephrase my question.

MR. SLOME: Okay.

MR. MILLER: I now understand your point.

MR. SLOME: Good.

MR. MILLER: Sorry.

MR. SLOME: Okay.

BY MR. MILLER:

Q As of 2003 the Regional Board was of the opinion that the Y-12 site was a source of significant concentrations of DCE entering groundwater, correct? Paragraph 8.

A Yes. I was looking to see --

Q Well, certainly you are welcome to read the next page, but if you want to know where I'm reading from, basically it's about four lines up from the bottom to six lines up from the bottom it's discussed.

A I was just looking to see how they define "site," see if it was limited to the Y-12 property, and it looks like it is in the first paragraph.

So yes, it looks like that was their interpretation at the time that this order was

prepared.

Q Now, later in time, in 2008, is there evidence that more DCE started approaching the property from some upgradient source, like Crucible?

A There is evidence of significantly elevated TCE, PCE and dioxin and DCE concentrations in the upgradient wells even at the timeframe, or even during the timeframe when the Water Board wrote this letter, although --

Q I want you to compare the levels you are talking about in the document you have, which, as I understand it, is entitled "Summary Report for Northrop Y-12 Site," report and figures in Attachment B, March 13.

Is that where you are looking?

A No. I'm looking at -- it's --

It may be some of the same figures, but I'm looking at the VOC well graphs, specifically at the historic VOC levels that have been measured in the Y-12 monitoring wells.

Q Well, I want you to compare them to the table on page 2 of the Exhibit 13.

A Okay.

Q PCE, 400 parts per billion, is there any upgradient source that strong approaching this

property?

A Not that's identified in the upgradient monitoring wells located at either end of the site.

Q All right. TCE, Regional Board reports 1,700 parts per billion located on -- in monitoring wells associated with Y-12.

Anything that high from an upgradient source in what you are looking at?

A Not identified in the two upgradient monitoring wells, no.

Q DCE, 537 parts per billion, anything that high in upgradient wells?

A Not in the two upgradient monitoring wells, no.

Q TCA, 192, anything that high?

A No.

MR. MILLER: Speaking of which, we got it back.

(Plaintiff's Exhibit 14 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Let me show you Exhibit 14.

As long as we have DCE and TCA data to look at, let's compare it to the table that you got at my request during lunch.

What is this table?

A This is a -- essentially a printout of the equation that's contained in the Gunther paper as far as the TCA degradation rate to DCE for a specific temperature, and that temperature is 20.3 degrees Celsius.

Q And this comes from your documents?

A Yes.

Q And it tells us about the DCE/TCA ratio over time, correct?

A Yes. Or TCA/DCE ratio, depending on which column you want to reference.

Q And Gunther is from Exponent?

A I believe so, yes.

Q Do you consider that a reliable source?

A It's a company that I'm familiar with. I would say they generally do good work.

Q Certainly you are not part of their advertising department?

A I'm not.

Q Okay. If we look at this, what is the hydrolysis half-life for TCA?

A Well, half of the TCA at this temperature would be converted into DCE after about 5.3 years at 20.3 degrees Celsius.

Q So basically when it becomes the number 1 --
A Yes.
Q -- in that table?
A In either of the rightmost two columns, yes.
Q Okay. Now, do you have any opinion concerning the general flow rate for groundwater in this area?
A The velocity?
Q The velocity in feet per year.
A That goes beyond the scope for which I was designated; but, yes.
Q What is it?
A I think it's variable.

In the coarser grained, sandy to gravely soil deposits, I think the typical velocities that are indicated by the available data were on the order of, oh, perhaps just under 1000 feet per year to up to perhaps 2500 feet per year during wetter periods.

Q Do you have any -- strike that.

In considering Crucible as a potential source of DCE to any Northrop site, did you consider the time it would take to travel a mile?

A Yes.
Q And what would that time be?
A Well, based on the groundwater flow velocity

range I just gave you, anywheres from roughly two years to five years.

Q Is that for first arrival as opposed to average flow rates?

A That would tend to be average without a retardation coefficient. So it would be slightly longer for TCA, DCE, probably very little retardation for dioxin.

Q Does the same flow rate apply to contaminants leaving the Northrop site?

A The range that I gave you earlier as far as the groundwater flow velocity?

Q In that type of material which you described as coarser grain.

A Yes. The data I've seen seems to be consistent with that range.

Q And is the groundwater flowing away from the Northrop Y-12 site heading toward the west?

MR. SLOME: Again, this is beyond the scope, but --

MR. MILLER: He has other opinions where this may be important.

THE WITNESS: Well, I think the groundwater flow direction is variable over time. The general direction is to the west. That has varied from

southwest to northeast -- I'm sorry, northwest.
BY MR. MILLER:
Q So 45 degrees?
A Maybe not quite 45 degrees but a better part of that.
Q As you move further away from the Northrop sites, does it start to get a southerly component?
A Eventually it becomes more westerly and then it takes on a southerly component, yes.
Q Do you have any opinions on whether or not the DCE detected in PAGE Mutual Well F came from a flow path that includes Y-12?
A I need to look at the site plans that are down at the end of the table to answer that question.
Q Please. Enjoy the walk.
A I would say since the mid-2000s that the flow path from the Y-12 facility would tend to go just to the north of PAGE-F.
Q Indicating a southerly component?
A Indicating a northerly component going past the Y-12 facility, gradually changing to a westerly component. And by the time it gets to the PAGE-F well, a particle leaving the Y-12 site would expect to be to the north of the PAGE-F well.
But again, I should mention this goes beyond

what I've been designated to address.

Q But you have a flow path map, correct? Or a particle tracking map? Which?

A It's a site plan that shows the location of the PAGE-F well and it has groundwater contours on it from OCWD with direction, flow direction arrows on it.

Q Well, if Y-12 goes to the north, that would cause a direct hit from EMD on the PAGE well?

A Do you want me to look at that?

Q Yes.

The question is would contamination flowing beneath the EMD site reach the PAGE mutual F well?

A Well, if I start --

Using The OCWD groundwater contours, if I start at the PAGE-F well and move upstream, I end up pretty much right between the two sites, south of Y-12 and north or at the north end of EMD.

Q Given dispersion, you would expect contamination from both sites to reach PAGE mutual F, correct?

MR. SLOME: Beyond the scope.

THE WITNESS: I don't think that's consistent with the available data.

BY MR. MILLER:

Q What is the separation distance between the two buildings?

A I could scale it off, but they are on opposite sides of the same street. So the sites are perhaps a few hundred feet apart, I mean the buildings.

Q As contamination moves across the landscape, it tends to spread out because of the paths particles take around those little grains of soil. They sometimes take too many rights or too many lefts, and it spreads it out, right?

A Tortuosity, yes.

Q For that reason, if you add a capture zone for the PAGE mutual F well when pumped, wouldn't you have the potential to have contamination from both sites enter that well as the groundwater flow fluctuates?

A If you release enough of a contaminant from sites in those -- in that area, it could potentially reach the PAGE-F well.

Q Well, if we look at Exhibit 13, paragraph 6, DCE, 537, isn't that a mass large enough that it could reach PAGE mutual F at detectible concentrations?

A Not necessarily, no. You have to look at

the lateral extent of the plume it's associated with that VOC, and if you do that for the Y-12 site I don't believe the data indicates there's a plume originating at Y-12 that extends anywhere near the PAGE-F well. And certainly the data I think for EMD is even clearer, that there's no contamination that's originated from the EMD site that has reached the PAGE-F well at least on a perceptible level.

Q The monitoring wells between the two, particularly if you get more than 5- or 700 feet away from the sites, are roughly once every half mile or so. They are rather sparse?

A Both sites?

Q EMD and Y-12.

A With respect to EMD, I would say perhaps every 1500 feet on average there's an FM series or an extraction well from which there's data available.

Q I might as well mark the map you have been using to answer my questions about flow paths and the one you just measured off on the density of observation points.

Could you grab it, please?

A Sure.

Q I assume your firm can print another that looks exactly like it on command.

A Yes.

Q Oh, great, just what I needed, a bigger map. We're going to need an 80-inch screen for this one for sure.

How long is it, 80 inches?

A I think a little less than that.

Q Might fit on the screen, then.

I apologize, Madam Court Reporter. We will have a map-folding expert assist you.

THE REPORTER: Thank you.

MR. MILLER: Everybody that has ever done a roadmap knows it's an art.

Q This is entitled "Groundwater 1,1-DCE Data for Lower Shallow Aquifer through Spring 2011, Plate 15," correct?

A Yes.

MR. SLOME: It's Exhibit 15, is it?

THE WITNESS: Plate.

MR. SLOME: But it's marked as an exhibit?

MR. MILLER: It's Exhibit 15 and Plate 15. Mere coincidence, not causation.

(Plaintiff's Exhibit 15 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Now, your firm depicted all of this data?
A Yes.
Q This is for shallow aquifer data. What does that mean? What depth? Less than 200 feet?
A Yes. It's for the lower portion of the shallow aquifer. We split, for data evaluation purposes, the shallow aquifer into an upper half and a lower half.
Q As contamination moves laterally away from the site, you would expect it to go down vertically somewhat, correct?
A It can. It's not necessarily going to do that in all cases.
Q And the PAGE-F well is screened between 186 and 364 feet? You are welcome to --
A That sounds correct, based on my recollection.
Q So it would intercept both shallow and deeper water?
A Yes. It appears to be cross-screened between the shallow aquifer and the principal aquifer.
Q Do you have a comparable map for DCE for the deeper aquifer that is something below what you are calling the lower shallow aquifer?

A Yes.
Q Is it on a map this size?
A Yes.
Q Just my luck.
Can I have Exhibit 16, please?
(Plaintiff's Exhibit 16 was marked for identification and is attached hereto.)
BY MR. MILLER:
Q Could you explain generally why you prepared these two maps, 15 and 16?
A To get the most recent measured VOC levels and the historic high VOC levels on a map where I could look at those values and see how they are distributed across the North Basin area, and particularly how they are distributed in the immediate vicinity of the Northrop sites and upgradient and downgradient of those sites.
Q I'm looking at the distribution of monitoring wells on the flow path between the Northrop sites and PAGE-F, and after FM-22 I see nothing in line for miles before what is labeled "F-CHR12" and "F-CHRI." Am I missing something? I see nothing between here and here, a distance of at least a couple miles.

A Nothing other than we're at 4-A to the south and 21 to the north. But yes, there's a pretty wide gap once you get downgradient to FM-22.

Q And FM-22 has a detection of TCE?

A DCE.

Q I'm sorry. I misspoke. Thank you.

A Has a most recent detection at 2.3 micrograms per liter and then a peak detection in November of 2010 of 3.2 micrograms per liter.

Q So that doesn't define the distal end of the DCE plume, correct?

A It depends if we're talking about a plume in excess of the MCL or a multiple of the MCL, or just a plume that includes even trace levels.

Q What is the distance --

MR. SLOME: Put your microphone on.

Hold on. Hold on. Hold on. We've lost our mic.

BY MR. MILLER:

Q What is the distance between FM-22 and PAGE-F?

MR. SLOME: It's on my lap.

MR. MILLER: You are welcome to --

MR. SLOME: I don't want it on my lap.

BY MR. MILLER:

Q Could you please shove it in his direction? It would be fun, you know that.

Go ahead.

A The distance between FM-22 and PAGE-F?

Q Yes.

A Okay. It's approximately 9,000 feet.

Q Less than two miles but close to two?

A Close to -- yeah, less than two miles.

MR. MILLER: We've been going for a while. Why don't we take a break.

THE VIDEOGRAPHER: We're going off the record. The time is 3:06.

(Off the record.)

THE VIDEOGRAPHER: We are now back on the record. The time is 3:14.

BY MR. MILLER:

Q I'm looking at Exhibit 16 and 15, and they both have the same note in the middle of the page. "Plume limits are based upon available data and should be considered approximate. Plume limits are generally not well defined - except where tightly constrained by monitoring well data."

Is that a statement your firm added?

A Yes.

Q Is it accurate?

A Yes.

Q Would you agree that if you go more than 700 feet past the Northrop sites, Y-12 and EMD, in the downgradient direction, there are few monitoring wells to provide data and define plume limits?

A More than 700 feet past either site?

Q Yes.

A Well, there's a cluster of wells located roughly 1600 to perhaps 2500 feet downgradient of Y-12. Past that you get into some open space and then past a group of wells located about -- up to 5,000 feet downgradient of EMD, after that there's quite a bit of open space.

Q And the monitoring wells located about 5,000 feet downgradient are not Northrop's. They are The District's, correct?

A Yes.

Q Northrop's monitoring well downgradient of the EMD site extends how far?

A The furthest well installed by Northrop downgradient of its site I believe is approximately just under 1000 feet downgradient.

Q Okay. We can roll this up for the moment.

MR. SLOME: Good. I won't spill my coffee.

(Plaintiff's Exhibit 17 was

marked for identification and is attached hereto.)

BY MR. MILLER:

Q Let me show you Exhibit 17. Did your firm prepare this document entitled "Estimated Perchlorate Plume Configuration for Upper Shallow Aquifer" -- let me start over again.

This is a September 2009 GeoKinetics figure, correct?

A Oh, yes. Looks like it.

Q And it depicts data for a perchlorate plume configuration for the upper shallow aquifer based on data available through February 2009, correct?

A That's what the title indicates, yes. I can't see the actual data on the map at this scale.

Q Did you prepare this figure, or direct someone to do it in your techy department?

A I probably would have been the one to have drawn contours on this.

Q In dark yellow, there appears to be a higher concentration of perchlorate that you are claiming is a plume, correct?

A That appears to be the case, yes.

Q Why did you prepare this?

A To evaluate the apparent extent of the

perchlorate contamination in various zones of the aquifers.

Q Did you check to see the historical use of the land depicted in the darker yellow in the upper plume?

A I've looked at aerial photographs going back to the 1920s.

Q And that area was orange groves back at least that far in time, correct?

A Yes, I believe that's correct.

Q Because of the pattern of ditch water, that's among the older areas of orange groves in Orange County?

A I don't know.

Q You know they had a ditch that ran from the Santa Ana River?

A Yes, I do recall seeing references to that.

Q And that it ran east to west?

A Yes.

Q Do you know where it ran, approximately?

A No.

Q Have you considered the possibility that the higher levels of perchlorate shown in the long, darker yellow plume are simply related to the fact that historically those orchards -- orange groves

used Chilean fertilizer?

A I haven't been asked to evaluate that as per my expert assignment.

Q Well, apparently you were asked to analyze perchlorate concentrations, correct?

A Not as part of my expert assignment in this matter.

Q As a part of some other work you were assigned to do?

A Consulting work, yes.

Q Do you have any opinions concerning the source of perchlorate contamination anywhere in the project area?

MR. SLOME: Well, it's beyond his scope.

THE WITNESS: That is beyond my assignment; but based on the documentation I've seen, yes.

BY MR. MILLER:

Q Is Raymond Basin a source of PCE?

MR. SLOME: Same objection; beyond his scope.

THE WITNESS: Are you asking about PCE?

BY MR. MILLER:

Q I misspoke.

Is Raymond basin a source of perchlorate?

A It does look like there were elevated perchlorate levels in the area of that basin.

Q Do you have any reason to believe Colorado River water was put in Carbon Creek and flowed to Raymond Basin?

MR. SLOME: Objection; beyond his scope.

THE WITNESS: I don't know.

BY MR. MILLER:

Q Have you studied where Colorado River water was historically recharged in this area?

MR. SLOME: Objection; beyond his scope.

THE WITNESS: I have seen references to that regard, but I haven't looked at them in probably years.

BY MR. MILLER:

Q Did you notice that the concentrations of perchlorate in this area appear to be highly variable where you go from something in the teens to -- you go further west and it's non-detect and then you go further west and it's 12 and then you go further west and it's 6?

A Yes.

Q Did it occur to you that that might be attributable to past rates of fertilizer on some but not all orange groves?

MR. SLOME: Same objection; beyond his scope.

THE WITNESS: That is something that I

considered, that doesn't seem like a reasonable explanation or the most likely explanation.

BY MR. MILLER:

Q If you have a plume coming from a source, don't you tend to get higher concentrations near the source and gradual but relatively consistent detections but gradually declining concentrations as you move away from the source?

A Not necessarily if it's an intermittent source of a contaminant that is not adsorbed to the soil. You can get slugs, disconnected plumes moving through an aquifer system one after the other.

Q If perchlorate was present in Chilean fertilizer used in orange groves in this area and some of the orange groves used the fertilizers and others didn't and -- wouldn't you get higher concentrations near the farm that did versus the one that didn't?

A I think it depends in part upon what time you looked at the concentrations.

Q Wouldn't it -- strike that.

Wouldn't fertilizer applied across an entire orange grove containing perchlorate cause continuing releases to the groundwater over time?

A Yes, though not necessarily continuous.

Q You would expect to see more of a flux entering groundwater during the irrigated portion of the growing season than any other?

A Or during periods of wet weather.

Q Don't you get more irrigation in an orange grove than rain in this area? It takes a certain amount of water to keep those trees alive, right?

A Over the course of the year, yes. But if you were to take a one-week or two-week or maybe even a one-month period and ask that same question, pick the wettest month, do you get more water associated with rainfall or irrigation over the wettest 12-month period of the year, whatever that period might be, then rainfall is going to exceed the natural irrigation for some years.

Q Tell me what about the pattern of this upper yellow so-called perchlorate plume is inconsistent with a farm source?

A Again this goes beyond the area that I've been asked to cover, but I don't believe there's anything necessarily inconsistent with an agricultural source that I see based on this data.

Q Listen to my question carefully.

Tell me why the data we're looking at for perchlorate in the darker yellow long plume on

Exhibit 17, why that data is inconsistent with a farm source?

MR. SLOME: He just did.

MR. MILLER: He did not. He gave me the other half, the flip side of the coin.

THE WITNESS: You're assuming I believe it to be inconsistent with a farm source?

BY MR. MILLER:

Q I'm asking you --

First of all, isn't this plume consistent with a source from historical orange groves?

A Potentially.

Q Okay. And that is one perfectly logical explanation of why the perchlorate appears the way it does in these contours that you've drawn?

A It's possible, yes.

Q And you haven't done the work necessary to rule that explanation out.

A Fair enough.

Q And you are not prepared to rule that explanation out at trial.

A This is not a subject matter that I've been asked to provide testimony on at trial.

Q As shown, there's a considerable separation distance between The District's recharge basins and

your perchlorate plume, correct?

A The elongated one to the north that you've been focusing on?

Q Yes.

A Yes.

Q And the one near Raymond Basin is literally based on one data point.

A I can't tell at this scale.

Q I've seen a bigger scale version. I was hoping you would remember since you did the map.

Do you know how many data points that's based on?

A The one near Raymond Basin?

Q Yes.

A No. I don't recall.

Q Isn't it fair to say that this shows that the perchlorate plume with higher elevations begins more than a mile, almost two miles away from Anaheim Lake?

A You are talking about the elongated zone to the north?

Q Yes.

A I would say more than a mile, yes.

Q Almost two?

A Probably pretty close to two, yes.

Q And you didn't think the perchlorate data in between could even be contoured, correct?

MR. SLOME: Objection; no foundation, misstates the testimony.

THE WITNESS: In between what?

BY MR. MILLER:

Q The basins and the beginning of what is shown here as an elongated perchlorate plume in darker yellow.

A I didn't draw contours between the basins and the darker yellow. I can't tell what the data shows on this scale.

MR. SLOME: What number was that?

THE REPORTER: 17.

MR. SLOME: Thank you.

BY MR. MILLER:

Q Do you have any other plumes -- strike that.

Do you have any other opinions concerning perchlorate you haven't mentioned?

A Nothing that I've been asked to testify about at the time of trial.

Q And you are not planning to testify about perchlorate at all at the time of trial, given your assignment; is that correct?

A Correct.

MR. MILLER: Exhibit 18.

(Plaintiff's Exhibit 18 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q Did you prepare this map entitled "Potential 1,4-dioxane PRP locations and alignment of Sewer from City of Fullerton and Sewer Master Plan"?

A It looks like a figure that was prepared by my office.

Q As opposed to you?

A I would have been involved in the preparation of it, yes.

Q You're determining sewer flow directions to test the hypothesis that discharges into the sewer by UOP may have caused a release of 1,4-dioxane?

A That was something that was done as a consulting task at one point, as I recall, yes.

Q The outer contour, the furthest most upgradient contour begins at the Fullerton Business Park?

A Yes. It appears to be shown that way on this diagram.

Q It includes Moore Business Forms?

A Yes, it looks like it.

Q The area within the contours includes Arnold Engineering?
A I believe so, yes.
Q Is 1,4-dioxane present in PCE products?
A TCE?
Q "P" as in Paul. Sorry.
A Oh. Typically not.
Q Is 1,4-dioxane typically in 1,1,1-TCA products?
A Often, yes.
Q And one of the reasons for that is that, particularly in the presence of water, TCA will break down into DCE and if you want to use TCA as a solvent you want to keep it as TCA, correct?
A Yes. It stabilizes the solvent.
Q That's a unique property of 1,1,1-TCA, it tends to break down very readily in the presence of water, whereas PCE and TCE do not, correct?
A Correct.
Q For that reason, you would not expect to see 1,4-dioxane in PCE or TCE, correct?
A Typically not.
Q Do you have any reason to believe some product other than TCA would have included 1,4-dioxane in the project area?

A Well, as I recall, one of the reasons we were looking at the UOP Separex site is because they use large quantities of 1,4-dioxane directly, not related to solvent form.

Q Apparently you didn't get enough data to contour their site?

A Not at the time this figure was prepared, it would appear.

Q And this was done when?

A Looks like it's dated October 2008.

Q Did you take samples along the sewer line between UOP heading in the westerly direction? Strike that.

Did you take samples between the UOP site and along the sewer line the west?

A I believe we collected a couple of Hydropunch samples at one point.

Q So your firm was involved in selecting the locations for the Hydropunches?

A Yes.

Q Looking at this map, is it fair to say that the sewer flows from UOP to the west up to, but not including, a major street that's not labeled here? It's --

Manhattan Avenue is listed as to the west of

it. Do you know what the major street is? Is it Acacia?

A I don't recall, but I see the street you are referring to.

Q It's between South State College Boulevard and Manhattan. Isn't that where Acacia is, at least the freeway exit?

A I could roll out the big map again and tell you; but short of that, I don't recall.

Q I just need to know if --

Yeah, just check it quick, please.

A Yes, it's Acacia.

Q All right. As you interpret this map, does the flow direction of the sewer pipe from UOP continue to the west between Acacia and Manhattan?

I don't see an arrow at that location. That's why I'm asking.

A I don't recall. It's been a long time since I've looked at this. My recollection is is that there was an older sewer line that flowed, as is indicated here, to the west and then at some point the system was modified when a new treatment plant was constructed so that the flow was south, down South State College Boulevard and no longer to the west as shown on this figure.

Q So does your assignment include testifying about UOP as an upgradient source of 1,4-dioxane?
A No.
Q Are there any other businesses shown on this figure that you will provide opinions on concerning the source of 1,4-dioxane?
A Yes.
Q Which one or ones?
A The Northrop Y-19 site.
Q And what is your opinion?
A That it does not appear to be a source of 1,4-dioxane or any other contaminant for that matter.
Q What was done at the Y-19 site?
MR. SLOME: I don't know what you mean "what was done." Do you mean what activities were conducted there?
MR. MILLER: Fine.
THE WITNESS: Based on the documentation I've seen, it looks like there was a relatively small laboratory facility that was operated there.
BY MR. MILLER:
Q Doing what kind of laboratory work?
A I don't know.
Q Were they handling PCE, TCE or DCE or TCA?
A I've seen references to small quantities of

VOCs that were used or stored at the laboratory at that address.

Q As laboratory standards?

A That certainly was the implication, not in conjunction with any manufacturing process.

Q All right. Let's turn to Exhibit 8.

MR. SLOME: Just bear with me. Just remind me what Exhibit 8 is. Okay.

BY MR. MILLER:

Q Do you have it?

A Yes.

Q This is your summary of opinions?

A Yes.

Q In page 2 it says "The testing results indicate a primary release of TCE occurred in the area of the former quench tank. Based upon the history of TCE and TCA usage, this release likely occurred prior to 1980. The TCE that was released at this location appears to have contained a small percentage of PCE."

That's your opinion, correct?

A Yes.

Q You are not suggesting that there was a release of TCE that ended prior to 1980 at all locations onsite, are you?

MR. SLOME: Can I just have that question reread, please?

BY MR. MILLER:

Q Let's try it this way: Was there a change in TCE usage at or near 1980?

A Yes, I believe there was.

Q And is that the reason for your comment?

A Yes.

Q And what was the change in usage?

A The solvent that was used for degreasing, cleaning purposes at that site originally was TCE and it was switched to TCA in approximately 1980.

Q You realize the Regional Board's taken the position that before TCE was used PCE was used at this site?

A I don't know that I've seen documentation to that effect.

Q Have you seen Regional Board documents to that effect?

A Not that I recall, no.

Q Paragraph 2, same exhibit, "A secondary, much smaller and more localized release of TCE appears to have occurred in the area of the former wastewater pretreatment plant on the west side of the building. The secondary release also likely occurred

prior to 1980 and contained a small percentage of PCE."

Is that your opinion?

A Yes.

Q Didn't the wastewater pretreatment plant in discharge to the sewer get worse after 1980 instead of better?

A I'm not sure what you are asking.

Q Wasn't there a greater potential for releases at the wastewater pretreatment plant later in time in the '80s than prior to that time?

A I don't know. Not necessarily.

Q You do understand that there's a contention that the pipe deteriorated and there was evidence of that for a later period of time?

A Yes.

Q Did you take that into consideration in forming this opinion?

A Yes.

Q Is your comment about pre-1980 releases related to the TCE use pattern?

A Yes.

Q Not to the condition of the pipe?

A I considered the condition of the pipe, but it's primarily related to the cessation of usage of

TCE in 1980.

Q Why do you say there was a small percentage of PCE in paragraphs 1 and 2? What product contained a small percentage of PCE?

A I believe the TCE did.

Q Basically in the manufacturing process, PCE would be present in the TCE at itself, it's not a commercially pure product as manufactured?

A Oftentimes, yes.

Q That implies the percentage would be less than 5 percent; commercial grade is typically 95?

A Yes. Less than 5 percent.

Q Do you have any way of knowing what percent?

A You could estimate based on the measured soil vapor levels, taking into consideration the vapor -- or the relative vapor pressure difference between TCE and PCE.

Q Did they ever find evidence indicating the potential presence of DNAPL at Y-12?

A No, not that I'm aware of.

Q Did they do enough sampling to rule it out?

A I believe so.

Q Considering the fact that they had 19,000 pounds of VOCs left in the soil after they completed their soil investigation program and got a no further

action letter, do you still believe they did enough sampling to rule out DNAPLs?

A When you asked me about sampling, I was considering groundwater sampling as well as soil, and I believe that combined database would tend to indicate that DNAPL is not present.

Q Well, I understand what you are saying about the groundwater.

There's no evidence of DNAPL in the groundwater is what you are saying, correct?

A Correct.

Q The concentrations aren't high enough to give that indication?

A Correct.

Q That doesn't rule out the possibility of fingering of DNAPL in the soil above groundwater, correct?

A I may have misunderstood your original question. Were you trying make a distinction between solvent that was released in either dissolved or vapor phase as opposed to liquid phase that came in direct contact with the soil?

Q No.

I'm asking about DNAPL, which is pure PCE or TCE in this context. Did they take enough samples to

rule out DNAPL releases to the soil that didn't reach groundwater at these sites?

MR. SLOME: Objection; vague as to time.

THE WITNESS: Well, I'm struggling with your use of the term "DNAPL" above the water table. It's relatively well-defined when you've got phase-separated VOCs present in the water table, falling through the water table, to characterize that or call it DNAPL.

What are you characterizing as DNAPL in the vadose zone above the groundwater table?

BY MR. MILLER:

Q Dense, nonaqueous phase liquid consisting of basically pure PCE or TCE.

A Well, certainly you are going to have that at least in a microscopic level. There's going to be liquid VOCs attached to soil particles. At some point at higher concentration, it becomes a higher and higher percentage and potentially begins to fill the void space of the soil. At what point would you call that DNAPL?

Q Aren't there criteria for indicating that soil-born concentrations represent the likely presence of DNAPL?

A There are with respect to groundwater

concentrations. I suppose if the soil pore space were completely filled with liquid phase solvent, you could call that DNAPL that hasn't migrated to the groundwater table.

But short of that, I don't know of a definition of "DNAPL" in the vadose zone, unless it's simply a layer of product that is pooled in an unsaturated area on a clay lens.

Q In order to get DNAPL in the groundwater, you got to have DNAPL pass through the soil above it, correct?

A Yes.

Q Did --

The fact that it enters the soil doesn't guarantee it will enter the groundwater as DNAPL?

A Correct.

Q So did they conduct enough soil sampling at the Northrop Y-12 site to rule out the presence of liquid PCE in the soil, pure product?

A There's going to be --

Any time there's vapors present or a soil matrix concentration of a VOC, there's going to be some part of that product that's present typically as a liquid as well.

Q Turn to page 3 of Exhibit 8.

A Yes.
Q It's your opinion that PCE was released at the Aero Scientific property and it reached the shallow aquifer, correct?
A You are looking at item 7?
Q Yes.
A Yes.
Q In paragraph 6, you state TCE-impacted perched groundwater contaminated the shallow aquifer and caused a plume exceeding 5 times MCLs up to about 1500 feet downgradient; that is, to the west of the site, correct?
MR. SLOME: I'm sorry. I think you may have misspoken. Can you just please reread the question?
MR. MILLER: I think I said TCE with a Tom.
MR. SLOME: I thought you said PCE.
MR. MILLER: T with a Tom.
MR. SLOME: Then you don't need to reread the question. If you are talking about TCE, that's fine.
MR. MILLER: I'm reading paragraph 6.
Q Is that your opinion?
A Yes.
Q By what time was it 1500 feet downgradient or to the west of the site at concentrations 5 times the MCL?

A That would have been --

At the time the Water Board concluded that the groundwater plume that was emanating from the site had been adequately characterized, that would have been July of 2004.

Q Did Northrop do anything to hydraulically contain that plume and prevent it from moving away from the site?

A You are referring to the plume in the shallow aquifer?

Q I'm referring to the plume 5 times MCLs up to 1500 feet downgradient, that is, to the west of the site, described in paragraph 6 as a release from Y-12.

A That's referring to the shallow aquifer.

Not that I'm aware of.

Q Would you expect that plume to continue to move with the groundwater?

A It will move until a state of equilibrium is reached between the extent -- the downgradient extent of the plume, the rate at which VOCs are dissipating and the rate at which they are being added at the source area of the plume.

Q Have you done studies necessary to estimate the rate of biodegradation of PCE or TCE in this

aquifer from the Northrop site?

A It's not something I've been asked to do as part of my expert assignment.

Q Did you do any computer modeling to evaluate that?

A Not as part of my expert assignment.

Q Did you evaluate whether or not the downgradient plume was moving deeper and deeper into the aquifer as it went downgradient?

A I considered that and evaluated that using some of the plume maps that we were discussing a little while ago, in part by separating the data between the upper portion of the shallow aquifer and the lower portion and looking to see if there became a point where the upper plume disappears and a plume continues in a lower section of the aquifer.

Q Do you have enough monitoring data to actually evaluate that more than 1000 feet away from the site?

A We're talking about the Y-12 site?

Q Yes.

A The data becomes more sparse, but there's still a significant amount of data several thousand feet downgradient.

Q Look at paragraph number 9, same exhibit.

A Yes.

Q "The TCA releases appear to have infiltrated to the depth of the perched zone and impacted the shallow aquifer. The TCA plume within the perched and shallow aquifer zones is no longer present."

Where did it go?

A The TCA was converted to DCE.

Q You then state "A relatively localized DCE plume remains in the perched zone from the transformed TCA. There does not appear to be an associated 5 times the MCL DCE plume within the shallow aquifer," correct?

A Yes.

Q Is that the same thing as saying that DCE did not reach the shallow aquifer?

A No.

Q Did it? Did the TCA plume released by Northrop at the Y-12 site cause a DCE plume in groundwater in at least the shallow aquifer?

A At any point in time?

Q Yes.

A Yes.

Q And that would have contributed to the overall load of DCE in the aquifer, correct?

A Yes.

Q I want to think about that out loud for a moment.

You've got contaminants coming down from the soil above groundwater and reaching the groundwater table and dissolving in it.

With me so far?

A Yes.

Q Initially that contamination is going to be confined to the shallow or uppermost portion of the aquifer, correct?

A Near the source, yes.

Q And it's going to take a while to get down, say, 40 feet deep into the groundwater?

A Yes.

Q It could travel 1,000 feet before it got that far down, correct?

A Yes, if it was released at a sufficient quantity and concentration. It's not necessarily going to get that far. It depends on your hypothetical.

Q So when you talk about the deeper portion of the aquifer beneath the site, that may be contaminated from an offsite source?

A Yes.

Q And the shallower water at the same hole

where you are taking samples might be from Northrop?

A Potentially, yes.

Q Since the contamination is in different zones in the aquifer, one tending to be deeper and the other tending to be shallower, would you really compare the concentration in an upgradient well to the concentration in a downgradient well if you didn't take into account the depth of the sample to evaluate Northrop's contribution?

A It's best to try to consider the depth of the sample and line up the zones, or at least the position of the potential plume that you are looking at.

Q Hypothetically, if Northrop contributed 60 parts per billion to shallow groundwater and the upgradient source were 40 parts per billion and you took your samples from the deeper groundwater, the upgradient and downgradient concentration could be 40 at both but miss a shallow contribution from Northrop at 60?

MR. SLOME: I just need that reread.

(The record was read as follows:

"QUESTION: Hypothetically, if Northrop contributed 60 parts per billion to shallow

groundwater and the upgradient source were 40 parts per billion and you took your samples from the deeper groundwater, the upgradient and downgradient concentration could be 40 at both but miss a shallow contribution from Northrop at 60?")

MR. SLOME: Objection; incomplete hypothetical. Okay.

THE WITNESS: In general, yes. The best indication of the presence of a source at a particular site is usually given by shallow monitoring wells at a given site as opposed to deeper ones which could miss a contribution from a source.

BY MR. MILLER:

Q So if you are going to compare apples to apples and evaluate the contribution of a source to groundwater, you want to pay careful attention to the depth of the samples that you are using for comparative purposes?

A Yes. Particularly at or immediately downgradient of a site, it becomes more critical that the samples you are looking at were taken near the surface of the groundwater table, unless you've got a scenario where you are dealing with DNAPL and then

it's a different situation.

Q Explain why DNAPL would be different briefly, please.

A It would have a tendency to sink to the bottom of an aquifer or until it finds an aquiclude, and that would create a scenario where potentially the highest VOC levels in groundwater are not near the source at the top of the aquifer but near the base of the aquifer.

Q Within your profession, over time they've been lowering the levels of PCE and TCE in groundwater that are indicative of DNAPL?

A I don't know if there's been a steady trend for that to occur. But certainly there have been a variety of opinions over the years to what concentrations could be indicative of the presence of DNAPL.

Q And in general, the trend is lower concentrations?

A I don't know that I can say that. I'm not disputing it, but --

Q Page 4, Exhibit 8, please.

A Yes.

Q Paragraph 16, "Following the completion of the site characterization activities in 2008,

Northrop has been aggressive and proactive with respect to site remediation."

That's your opinion?

A Yes.

Q That kind of excludes the period prior to 2008, doesn't it?

A During the site --

MR. SLOME: Objection. The question is improper because it deals only with one particular paragraph and not the entire document.

THE WITNESS: During the site characterization and assessment activities?

BY MR. MILLER:

Q Northrop stopped doing business at the Y-12 site in 1994, and between 1994 and 2008 Northrop received several orders from the Regional Board, whether it was administrative investigative orders or cleanup and abatement orders, that basically complained about the lack of progress at the site, correct?

MR. SLOME: Objection; mischaracterizes the orders, no foundation, argumentative.

THE WITNESS: I wouldn't necessarily agree with that, no. I believe the first two orders, as we discussed earlier, were for wells to be installed

rather than Hydropunch samples. Both of those orders were complied with.

The last order, which was a cleanup and abatement order, directed them to prepare, develop and implement a remedial action plan which they did relatively quickly after that order was issued.

BY MR. MILLER:

Q If you turn to the cleanup and abatement order --

I'm sorry, I've forgotten the exhibit number but it's easy to find I hope.

MR. SLOME: Exhibit 13.

MR. MILLER: Thank you. That does sound correct.

MR. SLOME: Here it is. You can use mine.

BY MR. MILLER:

Q On page 4 under the heading "It is hereby ordered"?

A Yes.

Q Paragraph number 4, "By February 9, 2004, submit a conceptual feasibility study of alternative groundwater remediation scenarios that potentially could be implemented after sufficient characterization of VOCs in groundwater that have resulted from discharges at Northrop's Y-12

facility."

Do you see that?

A Yes.

Q So back in 2003 they were directing Northrop to remediate the groundwater as part of a phased approach to the site.

A Yes.

Q And when is it that they started a pilot program to clean up the groundwater at Y-12, or the off-gradient plume? I'm sorry. Offsite plume.

A When did they actually start the operation, onsite operation of that system?

Q Yes.

A Testing -- installation and testing of the system began in June of 2008 in the same month that the remedial action plan was approved by the Water Board.

Q When the documents were submitted to the Regional Board concerning what you planned to do with the recirculation well, did The District promptly notify you and the Regional Board they were concerned that what you were doing would cause bromate formation?

A I don't recall a timing of the letter relative to the submission of the work plan to the

Water Board, but I do require a letter that contained a large number of concerns, and I believe that they expressed in that was one of them.

Q Now, you read the letter of their concerns?

A At some point, yes.

Q I think in order to get a clear record, we're going to need the date of the letter. I may be able to help you with it, but I would like you to check your chronology while I'm looking for the letter in my voluminous box of correspondence here.

A Looks like potentially April 8th, 2010. Another one, December 3rd, 2009.

MR. MILLER: Let me show you Exhibit 19, which is the letter of December 3rd, 2009.

(Plaintiff's Exhibit 19 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q You were proposing to use ozone sparging; is that correct?

A Yes.

Q And this letter expresses District concerns about the proposed recirculation well using ozone sparging?

A Yes.

Q At this point, from what you can tell from the letter, was the program actually in operation?

A It was being tested at this time, yes, at least periodically operated.

Q If you look at the first paragraph of the letter, it apologizes for not submitting the comments prior to the approval of the work plan but explains the reason was they didn't know about the work plan until it was approved.

Do you see that?

A Yes.

Q Is that consistent with your recollection?

A I don't know if they were made aware of it or not.

Q In any event, if you received this letter, you would have read it at the time in detail to find out what their concerns were?

A I don't recall when I received this letter, but I do recall reading it at some point.

Q You certainly would have received it within a relatively short time after December 3rd. Days, not months?

A I don't know. I see that I'm not copied on the letter.

Q Turn to the last page above Mr. Mark's

signature.

A Yes.

Q First sentence, "The use of ozone may result in the formation of bromate at concentrations of above drinking water standards. This has been an issue at a site a few miles west of Y-12 where ozone was used to treat groundwater extracted from the shallow aquifer."

He recommends analyzing for ambient bromide concentrations and then testing treated water for bromate, correct?

A Yes.

Q So you were aware of that issue by December 3rd, 2009, or thereabouts?

A I was? I don't know that that is the case, no.

Q Is there some reason you wouldn't have obtained the information in this letter?

MR. SLOME: Objection; calls for speculation.

THE WITNESS: I know I did obtain it at some point because I reviewed it. I just don't recall the date.

BY MR. MILLER:

Q When you learned The District was concerned about bromate formation, what did you do to make sure

that the laboratory testing treated water checked for bromate?

A I believe that comment was addressed by Orion who was performing the testing of the effluent -- influent and effluent samples from the well.

Q Weren't you the one who came up with the idea for the recirculation well?

A In part, yes.

Q Weren't you carefully following how that work was being done?

A I was monitoring it, yes.

Q Weren't you checking to make sure it was working properly when you were using ozone?

A I was looking at the VOC intake and effluent levels to see how efficient the destruction process was.

Q Were you monitoring for bromate to see if you were forming byproducts that were undesirable?

A There were samples that were collected routinely and analyzed for bromate, yes.

Q Based on your experience, are you aware of the fact that the use of ozone has, depending on where you are, caused unacceptable bromate formation?

A I have seen reference to the potential for formation of bromate and bromoform, another variance

of that compound.

Q You are aware of the fact that bromate is a regulated contaminant of drinking water, that if you exceed the MCL you can't use the drinking water without treating the water?

A Yes.

Q You are aware of the fact that that can cause some expense?

A Under some scenarios, yes.

Q Are you aware of the fact that the use of ozone can take naturally occurring chrome (III) and create chrome (VI) from it by adding to it?

A Yes.

Q Are you aware of ozone systems that have been shut down because of chrome (VI) formation?

A Not that I recall or -- but it wouldn't surprise me if that has occurred.

Q Did your firm establish a baseline by testing for the level of bromate in native water that hasn't been treated?

A I don't recall doing that.

Q Did you obtain data on the ambient level of chrome (VI)?

A Yes. I believe that was done.

Q Why did you do that?

A To evaluate background, both total chromium and chrome (VI) levels, to see if they were affected by the system.

Q Was the treated water tested to see what the chrome (VI) level was?

A It was, yes.

Q How is it -- well, strike that.

Did you later learn that unacceptable levels of bromate, that is, above MCL levels, were being formed by the treatment process that hadn't been detected by the laboratory you were using?

A Yes.

Q How did that happen?

A As I recall, OCWD sampled downgradient monitoring wells and reported that they detected bromate in more than one of the wells.

Q And that the levels were rather high? Several hundred parts per billion?

A Yes.

Q Well above the MCL for bromate?

A Yes.

Q Couldn't be explained by anything except the treatment process, given the levels?

A That seemed the most likely explanation at the time.

Q Certainly caused you to shut it down?
A After some confirmatory sampling, yes.
Q So how is it that the lab that Northrop was using missed this for over a year and they had to be told by The District that they were picking it up in their sampling?
A They've been asked that question, I'm sure. The response that I've heard secondhand is that the bromate was masked by a high chloride concentration in their tests.
Q Why would you have high chlorides?
A They are naturally present in the groundwater.
Q If you had alerted the laboratory that you were concerned about bromate formation, wouldn't they have looked for interference by chlorides and done something to deal with it prior to the time that you told them that there was a reported bromate problem as identified by The District?
MR. SLOME: Calls for speculation.
THE WITNESS: Oh, I believe the lab was aware that there was a concern about bromate and that samples were being submitted to them for bromate analysis as a result.
BY MR. MILLER:

Q All right. Let's go from the abstract to the specific.

What is the lab that we're talking about that did the bromate testing?

A As I recall, it was Associated Labs.

Q Did your firm hire them?

A No.

Q Did Orion hire them?

A I don't know if they were hired directly by Orion or if there was an existing contract between Associated and Northrop. I wasn't involved.

Q Who was the person who was responsible for the analysis at Associated Labs? And by that I mean the supervisor, not the technician who may have been doing the test. The person that you go to and talk to about the quality of the work and the one that looks over the shoulder of the tech doing the work.

A I don't know. I've never had any interaction with anyone from Associated Labs.

Q Well, after this incident did Northrop continue to use them for testing?

A I don't know.

Q Do you have any reason to believe they stopped doing the testing?

A Yes.

Q What is that?
A After this incident we began collecting samples and sending them to another lab. I don't know if samples continued to be sent to Associated.
Q When you say "we" collected samples, you mean members of your firm?
A Yes.
Q They were physically out in the field collecting the sample?
A Yes.
Q Was that a new practice following the bromate problem?
A Yes, I believe so.
Q So to your understanding, one of the things that happened after the bromate detection was reported is that the people collecting the samples changed?
A I should say there were additional samples that were collected. I believe Orion was and still is involved in the sample collection process. But in addition to that, we have periodically collected samples independently and sent them to a separate lab, sometimes jointly with OCWD, for bromate analysis.
Q In other words, what you are doing is you

are kind of doing split samples or otherwise trying to check the work of the other lab used by Orion?

A Well, the primary analysis for bromate, and potentially the only analysis for bromate, that I know of has been done by the lab that we are now sending the samples to.

Q Who is that?

A Exova, used to be West Coast Analytical.

Q To your knowledge, had anyone been told of the interference problem involving chlorides before The District reported they were picking up bromate in their samples?

A Anyone at the lab?

Q Yes.

Did anyone at the lab tell anyone at Orion or Northrop or your firm that they were having interference problems with chlorides in doing the bromate analysis before The District told you about the detection of bromate?

A No. No one, to my knowledge, was told, and I'm not sure the lab was aware that they were having interference problems with chloride.

Q Wouldn't a lab know about interference because it affects the method detection limit?

A The potential for interference is certainly

outlined in the EPA procedure as well as the means to deal with it.

Q Which includes the potential for calculating a higher than normal method detection limit because of interference?

A Our pre-filtration, as I recall, is what is discussed in the analytical method.

Q Did you know they weren't doing pre-filtration before The District reported that there was a bromate problem?

A I'm not sure how to answer that question because I don't know that they were not doing pre-filtration. They may have been.

Q You don't know?

A I don't know.

Q Who was in charge of finding out what went wrong with the bromate analysis at the lab?

MR. SLOME: Who is in charge where, at which --

Who was in charge at Orion? Who was in charge at his firm? Who was in charge --

MR. MILLER: Somebody, I assume, looked into this.

Q Who did?

I don't know with what firm. I'm not part of the Northrop team at the moment.

A I believe that was investigated by Orion.
Q Who?
A The person that I would have had the most interaction with who, I believe, would have at least initiated the investigation with the lab would have been a gentleman by the name of Matt Carfagio.
Q Spell. She will ask you later anyway.
A My best guess would be C-a-r-f-a-g-i-o, but I'm sure I'm butchering that.
Q Well, at least it's phonetic.
Is that the person you talked to who explained what he or she knew about the bromate problem with the lab?
A That's the person I would typically interact with regarding the site-sampling activities and what was happening with the operation of the well.
Q How long did the bromate problem go on before the problem was detected? Strike that.
How long did you use ozone before the bromate problem was reported by The District?
A It looks like extended operation of the well was initiated in December of '09 until, it looks like, the end of October 2010.
Q Almost a year?
A Yes.

Q And basically The District picked up the problem at a monitoring well they owned and operated some distance away from the treatment system, correct?

A I don't know if they were sampling one of the Northrop monitoring wells or the other one would have been their own well AM-41. I don't recall which of those two, perhaps both.

Q Roughly how far away are these potential monitoring points from the treatment system and the recirculation well?

A AM-41 is located -- just lay it out.

Looks like approximately 250 feet downgradient.

MR. MILLER: We're going to need to change the tape, and I'm about to go to a new exhibit. I'm not done, so let's just take a short break.

MR. SLOME: Sure.

THE VIDEOGRAPHER: We're going off the record. The time is 4:30.

(Off the record.)

THE VIDEOGRAPHER: This now begins disk number 4 in the deposition of Glenn Tofani. We are back on the record. The time is 4:41.

(Plaintiff's Exhibit 20 was

marked for identification and is attached hereto.)

BY MR. MILLER:

Q Exhibit 20. This is a status report for your groundwater remedial action plan recirculation well for Y-12, correct?

A Yes.

Q I was looking at the data. You recently enhanced the ultraviolet light treatment system because you were not reducing concentrations to below MCL levels, correct?

A Yes and no. We did enhance the system, but it's not necessarily -- I should say it's a desire but not necessarily a requirement that we reduce VOC levels in the effluent to below MCL levels.

Q You're injecting treated water into the portion of the aquifer that is hydraulically connected to the principal aquifer, correct?

A We're pulling water out of and discharging water into the same zone, the same aquifer. We're not taking out of one aquifer and putting into another. It's circulating water within the same zone essentially functioning as a filter. It's filtering VOCs out of the water within the same zone.

Q Isn't the area that you are injecting water

into that's been treated an area that is connected to the principal aquifer?

A It's separated by an aquitard. I guess you could say it's connected by an aquitard.

Q The water in the zone you are injecting treated water into makes its way into the principal aquifer, despite what you are calling an aquitard?

A Some of it does, yes.

Q And the reason for that is the aquitard is not regionally extensive.

A It appears to be laterally fairly extensive, but being an aquitard it still has some level of permeability and water can flow through it to some degree.

Q What is the percentage of sand in the clay of this so-called aquitard?

A Less than 50 percent. It's going to vary from location to location. The typical composition of the samples that I have seen probably have anywhere from 10 to maybe 25 percent fine sand and the rest silt and clay size particles.

Q Have you seen articles published in professional journals indicating that clay with sand in that range provides pathways to lower water-bearing zones?

A That level of sand content has very little impact on the permeability of the material.

Q I'm talking about pathways. Because you have that much sand in the clay, if you look at it over the distance the water's traveling, you are going to find pathways when you have that much sand present.

A I think there's general agreement that there will be some passage of water through the aquitard.

Q The name "aquitard" implies that it slows down movement between the zones but does not stop it, correct?

A Yes.

Q Now, if we turn to Table 4, "Summary of VOC Testing Results" --

A Yes.

MR. SLOME: I'm not there yet.

BY MR. MILLER:

Q -- we have results for upper casing and lower casing. The lower casing result would be the treated water that goes out into the aquifer?

A Yes.

Q And the upper casing would be the more contaminated water entering the recirculation well?

A Yes.

Q So let's see if we can get to the more recent results. Page 3 of 3, Table 4.

A Well, I should point out the most recent results are included in the Y-12 report that I gave you. More recent than what we're looking at here.

Q We'll get to that in a minute.

For PCE I see levels in the lower casing that are above MCLs, and that's consistent with your knowledge of the operating history of this system as of January 2012, correct?

A That there were frequently concentrations of PCE in the lower casing above the MCL?

Q Of 5, yes.

A Yes.

Q And for TCE, the concentrations in the upper and lower casing are significantly lower than for PCE, correct?

A Typically lower, yes, in both.

Q Is PCE harder to remove with the treatment process that you are using than TCE?

A Yes.

Q And is it fair to say that to this day you are not consistently producing treated water that is below MCLs?

A No, it's not fair to say that.

Q Is it unfair to say that?
A It is unfair.
Q Why? Do you have one set of results in February that are going to surprise me?
MR. SLOME: Objection; calls for speculation as to what will surprise you.
MR. KAPLAN: You can register laughter.
MR. SLOME: So I got one.
THE WITNESS: The recent results have been lower.
Here are the recent results. I think you've got a copy of it.
MR. SLOME: Identify the page and the document that you are talking about.
MR. MILLER: Table 2 "Summary of VOC Testing Results for Extended System Operation," and this is part of the summary report for Northrop Y-12 we're about to mark as the next exhibit.
MR. SLOME: 21.
MR. MILLER: Yes, but I'm going to need to end up with a copy, and right now I'm giving away my copy.
MR. SLOME: So one of the folks here is going to have to volunteer up theirs.
MR. MILLER: Yes.

MR. KAPLAN: Which one?

MR. MILLER: I'm going to mark the two reports, summary reports.

(Plaintiff's Exhibit 21 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q So the first is Exhibit 21. Identify it for the record, please.

A It's entitled "Summary Report for Northrop Y-12 Site," dated March 13th, 2012.

Q And this is the one where you polled the groundwater quality results after treatment from Table 2?

A Yes.

Q And I'm looking at February data and I see some PCE results above MCLs and some below, correct?

A The first sampling event in February was above at 6.6. The next one was below at 4.7. Next one was above at 6.0. The next one was below at 4.7. And then I received the sampling results for the first March event yesterday, I think those have been posted, and that was actually a 2.3.

Q Okay. Now I'll mark the next exhibit while we're on it.

The associated report with the figures and attachments for the summary report we just marked is Exhibit 22.

Is that correct?

A Yes.

(Plaintiff's Exhibit 22 was marked for identification and is attached hereto.)

BY MR. MILLER:

Q I have some questions about the recirculation well.

You've read comments from The District that they are concerned that the injection process into the aquifer that you are using is going to spread the plume?

A Yes.

Q Do you have a monitoring program to determine if that is occurring?

A There is monitoring that takes place that I believe would identify that if it's occurring.

Q Do you have monitoring wells that were placed for the specific purpose of determining if that's occurring?

A There were preexisting wells downgradient that were positioned to allow that to be evaluated,

and that's one of the reasons why the circulation well was installed where it was.

Q Okay. Do you have an area of lower concentration downgradient surrounded by areas of higher concentration in the monitoring wells downgradient?

A Yes.

Q So that prediction by The District appears to be supported by the data?

A No. What you just described, an area of lower concentration downgradient surrounded by an area of higher concentration downgradient, would be consistent I think with what would be expected from the operation of the well.

Q Basically if you inject water, you are pushing it down under pressure, correct?

A Yes.

Q You want water to enter the well so you can treat it?

A Correct.

Q So you are pushing more water out away that's treated?

A The water is recharged in a lower portion of the well, so that water moves outward. About half of it or just under half of it actually recirculates

back to the upper portion of the well and makes multiple passes through the circulation well, but some of the water does not recirculate and moves out and downgradient.

Q But it's being pushed out by the pumping and treatment process?

A Very locally around the well casing, but not to a significant distance since there's no net injection of water. If we were to take a fire hose, for example, and put it in a well and recharge water into that well, we create a groundwater mound that would push water and potentially contamination away from a well.

But with the recirculation well, there's no net extraction, there's no net recharge. It's balance. So the exact same amount of water that's pulled into the upper casing goes into the lower casing. It's as if you were to take a pump and put it out in the middle of a lake, you are not going to create a drawdown in the lake because you are pulling the water in and pumping it out in essentially the same spot. So it has only a fairly localized effect within the immediate vicinity of the circulation well.

Q Don't the lower concentrations immediately

downgradient and higher concentrations to the side indicate you are pushing the contamination out to -- laterally?

A Well, we have lower concentrations downgradient because we're recharging -- taking the VOCs out of the groundwater. So the groundwater that would normally flow past the recirculation well for some distance on either side, about 150, 175 feet on either side, gets brought into the well, the VOCs are removed, that water is recharged back into the aquifer. So we've got a clean shadow, if you will, of water that flows downgradient from the recharge well. And where that shadow or that zone of influence ends we move into an area that's not affected by the well and you've got higher VOCs laterally on both sides of the clean water plume that's being generated.

Q What is your understanding of the radius of water being drawn into the well?

A It's approximately a zone about --

The radius?

Q Radius. If you want to give me the diameter, I can figure it out. I divide by 2, but just --

A It looks like it's on the order of 200 to --

the diameter, the zone. On the order of 200 to as much as 300 feet, in that range.

Q 100- to 150-foot radius?

A Yes.

Q And water outside that is not being treated?

A Correct. Well, not outside laterally. Obviously if you were to go straight upgradient, it's being treated at large distances eventually as it approaches the well.

Q You are now relying on a UV system to destroy the chemicals?

A Yes.

Q Do you have scaling on the UV lights?

A We haven't yet. That was something we were concerned about, the potential for that. But after operating the system from August to the end of December and retrieving it to inspect for that sort of thing, as well as to make the modifications to the upper section by adding additional UV lights, we found no scaling.

So it doesn't look like that's going to be an issue, or at least not an issue over a relatively short period of time.

Q In order to change a UV light that's burned out, what do you have to do?

A Have a very small technician with scuba gear.

We have to --

Q But a much larger UV bulb.

A We have to pull the string out of the well and switch it out manually, although we haven't had to do that yet.

Q You don't need a crane?

A We use a crane when we have to pull it, but we have not had to pull it to switch out a UV bulb. That was another concern, that we were likely to lose a certain percentage of the bulbs simply because we're operating them underwater with the ballast underwater, and it was assumed that we would lose some percentage of them over time simply to leakage, to water infiltration. But we've not lost a single lamp.

Q Well, you wouldn't expect to lose it when they are new, but as time goes on you expect that you are going to start having that problem, correct?

A Losing them as a result of leakage or having to replace them simply because they wear out?

Q Both. It's a problem that tends to get worse with time, not with new equipment.

A I'm a little bit more optimistic with

respect to leakage than I was before. I'm somewhat surprised in our initial attempt we were 100 percent success rate without any leakage. We will have to replace lamps periodically over time as they lose their efficiency. I would expect probably at least annually.

Q Have you calculated in any way the cost per thousand gallons of water treated, including all of the consultants working on this experiment?

A I haven't yet. I can do that. I can tell you, if I include everything, what I would characterize as the R&D portion of it, where we're fabricating essentially a system that had not been developed or utilized before, I'll get one cost. If I now look at the cost of operating that system now that we've developed it and we know how to install it and operate it, that cost is going to be extremely low. It's a very easy system to operate.

Q It doesn't have people checking to make sure that you are using the right amount of UV and other treatment processes?

A Well, it's -- there's only two things that go into it. It uses power and not very much, and it uses peroxide. Both are --

Well, the power is automated or monitored

automatically. We've got a device which monitors the current draw of the UV lamps and that digital AM meter is interlinked with the controller of the pump that circulates the water. So in the event, if we were to lose one or more of the UV lamps, that system will automatically reduce the rate at which water is being circulated to accommodate for that loss. That's a pretty nominal concern now since we haven't lost any lamps.

The peroxide addition rate is monitored remotely by a camera that we installed at the site essentially 24 hours a day. It's an infrared camera so we can see the controller at night; and if there's any change in the peroxide rate, we would know that right away.

So the level of monitoring and the level of maintenance has so far been fairly nominal.

We are required to refill the peroxide tank, given the size of the tank we have out there, once a week now. And we collect groundwater samples from the effluent in an adjacent well once a week.

Q When you treat the way you are treating and you are trying to treat PCE, you form hydrochloric acid, correct?

A There's trace levels of HCL that are

generated as an end product, yes.

Q HCL is hydrochloric acid?

A Yes.

Q Isn't that going to wear on the metal?

A I think the HCL within the environment, the metal --

You are talking about the casing or the pump?

Q Metal, any metal that is exposed.

A Is the -- is not going to be significant. The issue or the primary issue for corrosion has to do with the addition of the hydrogen peroxide which creates a very oxidative environment. All of the components of the system are stainless steel because of that. But the amount of HCL that's generated, you know, we're dealing with water that's got a total of 50 or 60 micrograms per liter total VOCs. That -- the amount of HCL that's generated at the end process isn't even detectible and it's entirely buffered by carbonates that are present in the system.

Q You have had occasional spikes in the concentration of chrome (VI) associated with this system?

A Not that I know of.

Q Wouldn't a concentration above 4 concern

you, 4 parts per billion?

A In all of the monitoring results we've had, the chrome (VI) levels in the influent and effluent were essentially the same, at least there was no statistical difference.

Q What table do we find the testing for chrome (VI)? I had it earlier and I flipped the page.

A It's probably 5.

Q Is that after the figures?

A It should be -- oh, I'm sorry. I was looking in your status report, Exhibit 20.

Q All right. Let's go to Exhibit 20, Table 5.

A I did not include a summary table for inorganics in the Northrop report.

Q With what frequency are you testing for chrome (VI)?

A Quarterly or occasionally more frequently.

Q Didn't you have a concentration above 4? I don't see it in this table, but I saw it in one of the reports.

A I can look and see.

Q You understand that 4 parts per billion is the discharge standard for the Regional Board?

A I don't recall the limit off the top of my

head. I can grab one of our status reports which will list the earlier values.

MR. SLOME: Why don't we do that tomorrow?

MR. MILLER: It is after 5:00. I will respect the fact that some people have to travel to San Diego.

MR. SLOME: Two of us.

MR. MILLER: So we'll adjourn for the day, but I would like you to have the chrome (VI) results handy in the morning, please. And you might check, unless my eyes are deceiving me, there's a chrome (VI) level above 4.

MR. SLOME: Off the record.

THE VIDEOGRAPHER: That concludes today's deposition. We are going off the record. The time is 5:06.

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REPORTER'S DEPOSITION TIME LOG:

REPORTER - MARIANNA DONNER

DATE - WEDNESDAY, MARCH 14, 2012

WITNESS - GLENN D. TOFANI

ATTORNEY	ON RECORD	OFF RECORD	TOTAL
MILLER	9:37 A.M.	10:26 A.M.	0:49
	10:44 A.M.	10:46 A.M.	0:02
	10:47 A.M.	11:54 A.M.	1:07
	11:58 A.M.	12:09 P.M.	0:11
	1:15 P.M.	1:43 P.M.	0:28
	1:35 P.M.	2:21 P.M.	0:46
	2:27 P.M.	3:06 P.M.	0:39
	3:14 P.M.	4:30 P.M.	1:16
	4:41 P.M.	5:06 P.M.	0:25
		TOTAL USED:	5:43

STATE OF _____)
) ss.
COUNTY OF _____)

I, the undersigned, say that I have read the foregoing deposition, and I declare, under penalty of perjury under the laws of the State of California, that the foregoing is a true and correct transcript of my testimony contained therein, incorporating any and all changes and/or corrections as noted by me.

EXECUTED this _____ day of _____, 2012, at _____.

_____
GLENN D. TOFANI
Volume 1

I, the undersigned, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

I further certify that I am neither financially interested in the action nor a relative or employee of any attorney of any of the parties.

IN WITNESS WHEREOF, I have this date subscribed my name.

Dated: _____

_____

MARIANNA DONNER, CSR, RPR, CLR
CSR No. 7504